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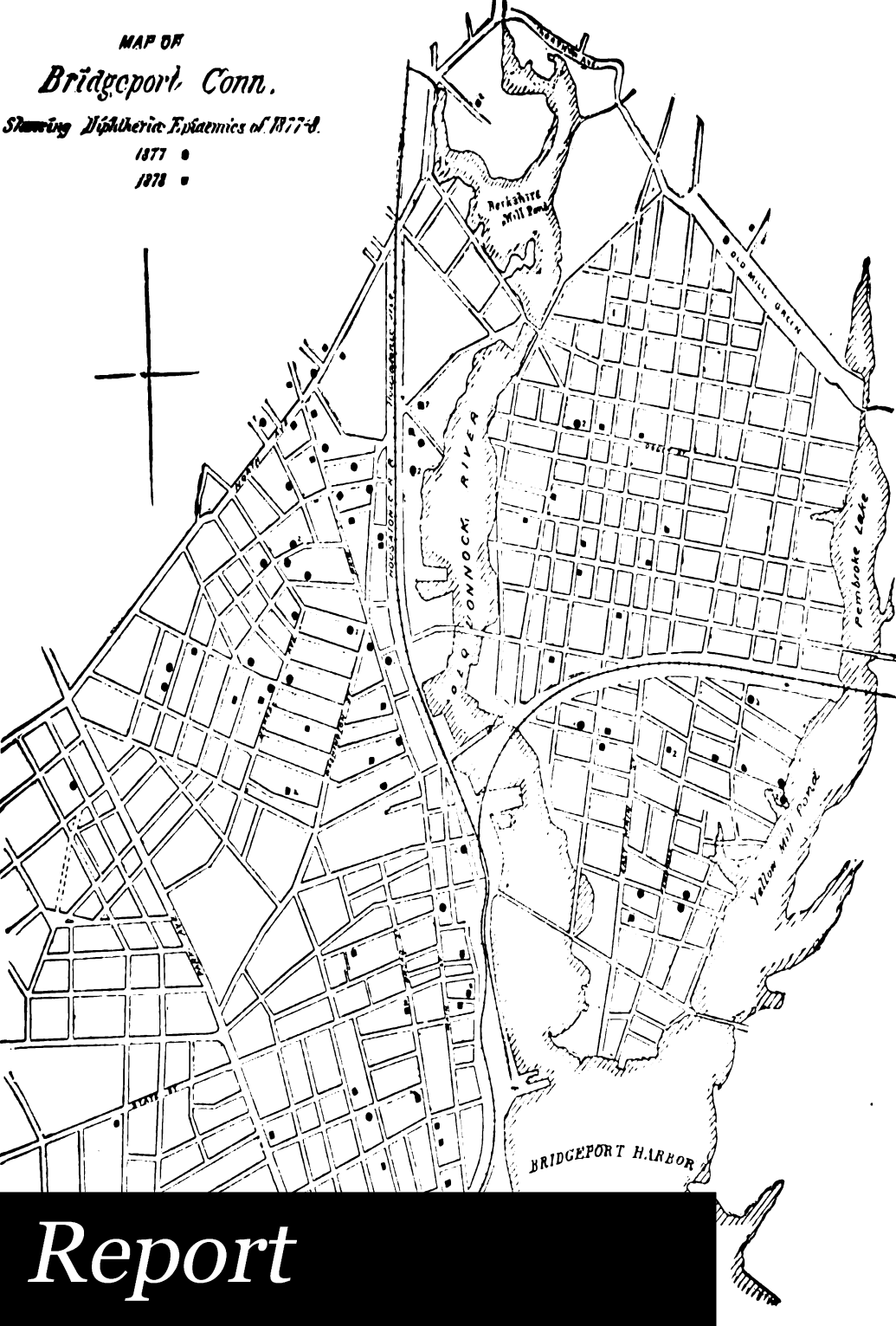

Report

Connecticut. State Dept. of Health

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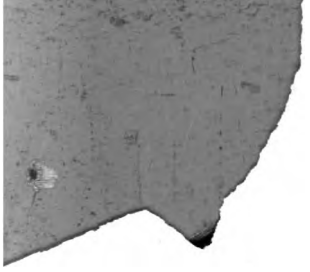

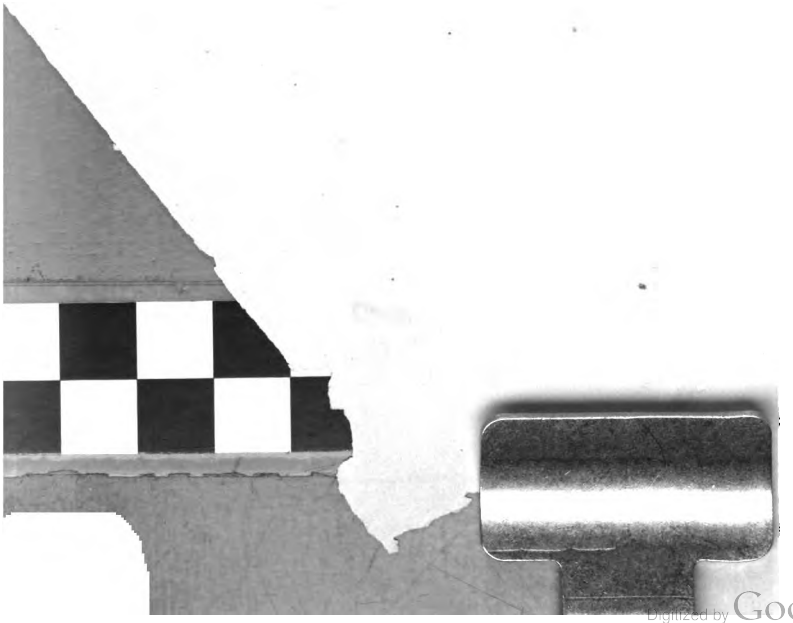

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FIRST ANNUAL REPORT

OF THE

STATE BOARD OF HEALTH

OF THE

STATE OF CONNECTICUT.

FOR THE

Fiscal Year Ending November 31, 1878.

Printed by Order of the Legislature.

HARTFORD, CONN.:
PRESS OF THE CASE, LOCKWOOD & BRAINARD COMPANY.
1879.

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STATE OF CONNECTICUT,
OFFICE OF THE
SECRETARY OF THE STATE BOARD OF HEALTH,
HARTFORD, December, 1878.

To His Excellency R. D. Hubbard, Governor of Connecticut:

SIR,—In compliance with the laws of this State, I have the honor to present to you the accompanying report for the fiscal year ending November 30, 1878.

Very respectfully,

C. W. CHAMBERLAIN,
Secretary of the State Board of Health.

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AN ACT ESTABLISHING A STATE BOARD OF HEALTH.

GENERAL ASSEMBLY, JANUARY SESSION, A. D. 1878.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

SECTION 1. That the governor, by and with the advice and consent of the senate, shall appoint six persons, three of whom shall always be physicians, and one lawyer, who, together with a secretary to be elected by them, shall constitute the State Board of Health. Of the six persons first appointed, two shall serve for two years, two for four years, and two for six years, from the first day of July next following their confirmation, and the governor shall hereafter biennially appoint, by and with the advice and consent of the senate, two members of said State Board of Health, to hold their offices for six years from the first day of July next following their confirmation. If a vacancy occur in said board during a recess of the legislature it shall be filled by the governor until the next regular session of the same.

SEC. 2. That the State Board of Health shall meet at least once in every three months, and as much oftener as they may deem proper. Four members shall always constitute a quorum for business. No member of the board shall receive any compensation except the secretary, but the actual traveling and other expenses of the members while engaged in the duties of the board shall be allowed and paid out of the appropriation made for its support. They shall select annually one member of the board as president, and shall appoint a suitable person, who shall be a physician, to be their permanent secretary and executive officer, who shall hold his office so long as he shall faithfully discharge the duties thereof, but who may be removed for cause at any meeting of the board, a majority of the members voting therefor. If a member of the board be elected as secretary the vacancy thus caused shall be filled by the governor, as provided in section first.

SEC. 3. That the secretary shall keep a record of the acts and proceedings of the board, perform and superintend the work prescribed in this act, and such other duties as the board may order under their general direction, and shall receive an annual salary of one thousand dollars, which shall be paid him in the same manner as the salaries of other State officers are paid, and such necessary expenses as the comptroller of the treasury shall audit, on the presentation of an itemized account, with vouchers annexed and the certificate of the board, shall be allowed him.

SEC. 4. That the said State Board of Health shall take cognizance of the interests of health and life among the people of this State; they shall make sanitary investigations and inquiries respecting the causes of disease, and

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especially of epidemics, the sources of mortality, and the effects of localities, employments, conditions, *ingesta*, habits, and other circumstances upon the public health; and they shall collect such information in respect of these matters as may be useful in the discharge of their duties, and contribute to the promotion of health and the security of life in this State; they shall cause to be made by their secretary or by a committee of the board, inspections at such times as they may deem best, and whenever directed by the governor or the legislature, of all public hospitals, prisons, asylums, or other public institutions, in regard to the location, drainage, water supply, disposal of *excreta*, heating and ventilation, and other circumstances in any way affecting the health of their inmates, and shall also suggest such remedies as they may consider suitable for the removal of all conditions detrimental to health in the said institutions, in writing, to the officers thereof.

SEC. 5. That the said board shall cause all proper sanitary information in its possession to be promptly forwarded to the local health authorities of any city, village, town, or county in this State, which may request the same, adding thereto such useful suggestions as the experience of said board may supply. And it is also hereby made the duty of said local health authorities to supply the like information and suggestions to said State Board of Health, together with a copy of all their reports and other publications. And said board of health is authorized to require reports and information (at such times and of such facts, and generally of such nature and extent, relating to the safety of life and promotion of health, as its by-laws or rules may provide) from all public dispensaries, hospitals, asylums, infirmaries, prisons, and schools, and from the managers, principals, and officers thereof; and from all other public institutions, their officers and managers, and from the proprietors, managers, lessees, and occupants of all places of public resort in the State; but such reports and information shall only be required concerning matters or particulars in respect of which it may in its opinion need information for the proper discharge of its duties. Said board shall, when requested by public authorities, or when they deem it best, advise officers of the state, county, or local government in regard to sanitary drainage, and the location, drainage, ventilation, and sanitary provisions of any public institution, building, or public place.

SEC. 6. That it shall be the duty of the state board to give all information that may be reasonably requested, concerning any threatened danger to the public health, to the local health officers, and all other sanitary authorities in the State, who shall give the like information to said board; and said board and said officers, and said sanitary authorities shall, so far as legal and practicable, co-operate together to prevent the spread of disease, and for the protection of life and the promotion of health, within the sphere of their respective duties.

SEC. 7. That said board may, from time to time, engage suitable persons to render sanitary service and to make or supervise practical and scientific investigations and examinations requiring expert skill, and to prepare plans and reports relative thereto. And it is hereby made the duty of all boards and agents, having the control, charge, or custody of

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any public structure, work, ground, or erection, or any plan, description, outlines, drawings, or charts thereof, or relating thereto, made, kept, or controlled under any public authority, to permit and facilitate the examination and inspection, and the making of copies of the same by any officer or person by said board authorized; and the members of said board, and such other officer or person as may at any time be by said board authorized, may, without fee or hindrance, enter, examine, and survey all such grounds, erections, vehicles, structures, apartments, buildings, and places.

SEC. 8. That it shall be the duty of the State Board of Health to have the general supervision of the State system of registration of births, marriages, and deaths. Said board shall prepare the necessary methods and forms for obtaining and preserving such records, and to insure the faithful registration of the same in the several counties, and in the central bureau of vital statistics at the capital of the State. The said board of health shall recommend such forms and amendments of law as shall be deemed to be necessary for the thorough organization and efficiency of the registration of vital statistics throughout the State. The secretary of said board of health shall be the superintendent of registration of vital statistics. As supervised by the said board, the clerical duties and safe keeping of the bureau of vital statistics thus created shall be provided for by the Comptroller of the State, who shall also provide and furnish such apartments and stationery as said board shall require in the discharge of its duties.

SEC. 9. That the said board, on or before the first day of December in each year, shall make a report in writing to the governor, upon the vital statistics and the sanitary condition and prospects of the State, which report shall also set forth the action of said board, and its officers and agents, and the names thereof for the past year, and shall contain a full statement of their acts, investigations, and discoveries, with such suggestions for further legislative action or other precautions as they may deem proper for the better protection of life and health. This report shall also contain a detailed statement of the moneys expended by said board, and the manner of their expenditure the year for which it is made; but the total amount paid for the expenses of this board, including the salary and expenses of the secretary, shall not exceed three thousand dollars, which amount is hereby annually appropriated for this purpose, to be paid by the treasurer, on the comptroller's warrant, in such sums as the certificate of the board, with proper vouchers annexed, may certify from time to time.

SEC. 10. That this act shall take effect from the date of its passage; and that all acts or parts of acts inconsistent herewith, be, and the same are hereby, repealed.

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GENERAL REPORT.

The requirement of a report in December renders this first report necessarily incomplete, as the returns from the registrars of vital statistics are not made until the last of January of the ensuing year, and the report on vital statistics cannot be made until our second annual report, from the nature of the subject. This report therefore covers but the brief period of five months, and notwithstanding the little time we have had in which to work, it is hoped that this first report even may be of interest and value to the people of the State, in whose behalf we labor. The following statement explains our plans and methods thus far:

The work entered upon during the first few months, must, in the nature of things, be, to a great extent, of a preliminary or preparatory character. Before entertaining any very comprehensive plans, a survey of the field, and exact knowledge of the sanitary condition and requirements of the State was needed, to secure a solid basis of fact, preparatory to action. The work of organizing the board and bringing it into communication with the people, was obviously among the first to be undertaken. To awaken intelligent interest in sanitary science, and demonstrate its practical utility not only in preventing disease and prolonging the average duration of life, but also in securing healthy and efficient lives would excuse the devotion of a much greater period of time to the sole endeavor to develop a public sentiment that shall regard a neglect of plain sanitary principles as criminally careless.

In the systematic effort to bring clearly before the people of this State the value of sanitary science, and to show what it has accomplished, and can accomplish for families, communities, and states, the following plan has been followed for the most part: 1st, To assign to each member of the Board some special field for work and investigation, the results as they take shape to be printed in our reports. 2d, By publications, short and concise, explaining in general terms the nature and scope of public hygiene, and our

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objects and aims. The following circular was sent to every clergyman in the State, as "the same causes which produce physical disease, foster also immorality, degradation, and social misery. Uninhabitable habitations, foul air, neglect of personal and public cleanliness, insufficient sanitary appliances, are not only factors of disease but of moral degradation."

The appeal to the clergy was rendered appropriate, too, from their position as public instructors, since they as a class are among the most public-spirited of our citizens, and from the nature of their work come into close relations with all classes of society.

CONNECTICUT STATE BOARD OF HEALTH.

To the Clergy of the State of Connecticut:

Rev. Sirs,—As you are probably aware, the Legislature at its last session passed the act creating a State Board of Health. We desire the co-operation of all interested in the welfare of humanity in our work. As unsanitary conditions have a close and perhaps causative relation to want and misery, and foster the development of vice and crime, we make a special appeal to you for aid.

Great advances have been made of late in ascertaining the causes and prevention of disease, and controlling the contagious and infectious diseases which form an unnecessarily large element in the production of sickness and death in our own State. The knowledge of the means of preventing and controlling these evils to a very great extent has already been gained, and it is only necessary to diffuse it among the people and act upon it to reap the results in the improvement of public health, the promotion of public happiness, and the prolonging of human life. To carry out these measures extensively, requires some public agency and the support of all classes of the community. The work of the Board in some of its principal features might be thus outlined:

To instruct the people as to the causes and prevention of disease; to study the local influences affecting health,—race, population, soil, water supply, drainage, food, labor, climate, productions, social conditions, etc., —to obtain accurate and reliable statistics relating to birth, marriage, and death rates, and their relations to race, sex, age, etc.; to watch the appearance of infectious and contagious diseases and study them as influenced by local conditions, and to take measures to control them; to study unsanitary conditions as they exist amongst us, and to recommend measures for relief; to organize and systematize the work throughout the State, by encouraging the formation of local health boards.

We desire correspondents in each town and village concerning our work, and would solicit from you, in addition to what aid you can give us in this direction, the names of those, one or more, in your localities who would act as regular correspondents and properly represent the district. All blanks, etc., for correspondence will be furnished on application to the Secretary.

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The responses received to this were most encouraging, and the generous promises of aid fully realized when called for.

The circular on public hygiene is designed for more general distribution, and special editions, varied somewhat, have been sent to every physician in the State, to members of the learned professions, men in public stations and the like, and to any desirous of comprehending the general nature of sanitary work. Two thousand copies of this have been circulated.

PUBLIC HYGIENE.

"The aim of public hygiene is to arrest or prevent, by official measures, all diseases which are not, in their nature, strictly limited to the individual, but which, from external causes, or from their specific characters, have a tendency to spread throughout families, institutions, and communities, and which cannot be otherwise controlled."

Sanitary science has proved that many of the diseases which act as the principal factors in producing death, are preventable and controllable by practical hygienic measures from the neglect of which not only are many precious lives wasted every year, but many also crippled and dwarfed by disease; lucrative enterprises abandoned; hopes blasted, and poverty and want induced, if not pauperism, vice, and crime, from the distress caused by the losses resulting from unnecessary sickness and death.

It costs to be sick, and more to die; and if we simply estimate the cash value of the lives wasted each year, during the productive period of life in this State, the sum would be expressed in many millions of dollars. This estimate rests upon the same basis used by the great business men of the world, the statesman and scientist, and is as reliable also in sanitary science.

Although the general principles concerning the prevention of disease have been long known and published, still the knowledge has been confined to a few, and consequently their application has been limited, and it is not until the elements of sanitary science are known and appreciated by every citizen that the desired results can be fully attained in the prevention of disease and death, the preservation of health, the prolonging of human life, and the promotion of public wealth and prosperity.

Says Disraeli, "The health of the people is really the foundation upon which all their happiness and all their power as a state depend. The health of the people is, in my opinion, therefore, the first duty of the statesman; and I am confident that there is no object of higher importance to engage the interests of society."

Great advances have been made during the last few years in sanitary science, in relation to the causes of disease and the control of epidemic, infectious, and contagious diseases. To systematically disseminate this knowledge among the people, and carry out the necessary measures extensively and throughout the State requires some public agency, and this work the State Board of Health propose to inaugurate and carry out.

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The prosperity of any community, and its comparative healthfulness, are inseparably connected, and unsalubrious conditions effectually check development and growth. It is a part of our work to investigate the local conditions affecting health and longevity in the State; and here the value of registration of vital statistics becomes apparent, showing that diseases appear irregularly and with certain conditions, increasing or decreasing as these conditions vary.

Besides the great value in the work of the Board of the complete return of vital statistics we hope to secure, the legal and historic value of complete statistics is unquestionable in relation to Probate Courts, and in securing titles, in deciding questions of legitimacy, settlement, and descent, in their relations to life insurance, annuities, endowments, and in establishing the claims upon government for pensions. Unless their attention has been especially directed to the subject, but few are aware of the interests involved in a complete return of vital statistics in any community in relation to the art of healthy living, and in promoting the best interests of society.

The value of family training, of the heritage of unvitiated constitutions, the penalties of vicious living exacted from succeeding generations, and in fact all the varied agencies that war against health and life can only be fully appreciated by reviewing the life-history of many successive genera tions from the cradle to the grave. The welfare of the living, duty to the dead that their loved ones should not be inconvenienced or defrauded by negligence to secure the protection thus offered, and the ends of public justice, public order, and public morality in securing every safeguard that the law throws around the sanctity of marriage, the legitimacy of birth, and the burial of the dead, as well as the aid thus afforded to the prevention of crime, alike demand that these records shall be *complete, prompt,* and *faithful.*

The work of the State Board of Health, thus briefly sketched in some of its aspects, affecting as it does the interests of the public at large, and having for its central aim and purpose the promotion of public prosperity, and a "race of healthy, vigorous, long-lived, moral human beings which sanitary administration tends to produce," can depend upon no one profession or class for support, but must enlist the sympathies and co-operation of all in dealing with interests so complex and varied. The value and power of sanitary administration has been so thoroughly tested that we appeal with the utmost confidence for that assistance and co-operation we need in forming local organizations throughout the State, and render ing of practical benefit the knowledge and powers now available in the prevention of disease and death.

In no other way can the cause of rational scientific medicine be so well advanced or medical superstitions of every form dissipated, as by teaching the people the true nature of disease, its causes and prevention. Nor can we as physicians better secure for our profession its true place and influence in the State than by working in the field opened to us by the creation of this Board. We therefore appeal especially and confidently to the physicians of the State for their aid; we desire special correspondents in

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every town who will report upon the public health and local sanitary affairs. All blanks necessary for correspondence will be furnished by the Secretary. Especial attention is called to the digest of registration laws, and regular monthly returns to the registrars earnestly solicited. The value of vital statistics depends upon their comparative completeness and exactness, and this can only be secured by regularity and promptness in the individual returns.

By order of the Board,

C. W. CHAMBERLAIN, M.D.,
Secretary State Board of Health.

3d. By the publication of plain and simple statements concerning the nature of some special form of disease, the manner in which it spreads, its causes, and practicable directions for prevention and control. As diphtheria has been very prevalent in this State, and is likely to become endemic unless systematically resisted, it was selected as the first of a series of health manuals which will be extended to embrace such subjects as are most closely related to healthy living, and in relation to which ignorance and negligence are most harmful. This is intended for general distribution to all school boards, health authorities, clergymen, physicians, and to the people generally, and to be kept on hand for use whenever called for.

RESTRICTION AND PREVENTION OF DIPHTHERIA.

GENERAL RULES AGAINST INFECTION.

Pure air, pure water, proper food and clothing, are essential conditions of health. *Cleanliness, dryness,* and *ventilation,* in and around dwellings and places of public resort, are the surest safeguard.

No house refuse, filth, excremental matter, or foul dirt should be allowed to remain about inhabited dwellings.

Filthy, foul, and *damp* places, saturated with sink or slop water, and shaded by vegetation or otherwise, near dwellings or places of public resort, should be purified, cleansed, and dried, and as free access of air and sunlight provided as possible. They foster, nourish, and render more fatal, if they do not produce pestilential diseases.

Disinfection should be thoroughly and persistently used at the appearance of a contagious disease. Disinfectants destroy contagion that would otherwise spread and multiply.

All sewer connections should be trapped and *ventilated.*

Nurses and attendants should spend some time each day in *pure air,* and take out-of-door exercise whenever possible, but at such times as to avoid contact with others.

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DIPHTHERIA

Is an infectious and contagious disease, though not as contagious as scarlet fever or small-pox, still requiring great precaution. Children are more liable than adults, and may convey it to one another, or it may be conveyed to them by adults.

The infection clings to articles in the room where cases have occurred, causing a reappearance of the disease, and after a single case it often breaks out in many places, always within a restricted area, sometimes gathering strength in its passage. Hence the importance of thorough disinfection. Unsanitary conditions favor its spread and increase its malignancy.

It is contagious by the exhalations from the sick, contaminating the air of the sick-room *in proportion to the severity of the case*, and the extent of the membrane in the throat; by direct contact with infected articles, *e. g.* by the use of eating or drinking utensils, towels, handkerchiefs, etc., used about the sick. It is conveyed by the diphtheritic membrane coming into contact with any mucous surface (*e. g.* mouth or nose), through kissing, sneezing, or coughing. The poison usually enters the system through the throat and upper air-passage.

RULES FOR PREVENTION.

First. ISOLATE THE SICK in a well-ventilated room, preferably the uppermost room in the house. Place the bed so as to be accessible on all sides. Allow no person to enter except the necessary attendants. *In malignant cases* allow no one to go from the house to school, or to any public assembly.

Second. In preparing the sick-room remove all unnecessary articles of furniture. Carpets, curtains, and table covers are especially liable to retain infection. After use the room should be cleansed and ventilated, and in malignant cases, disinfected thoroughly.

Third. All bed and body clothing, towels and handkerchiefs used by the sick, as soon as removed, should be placed in vessels containing disinfecting fluids, and never be washed with other household articles. All plates, cups, glasses, spoons, and the like, used by the sick, should be rinsed with some disinfectant and washed separately.

Fourth. Nurses and attendants should wear only washable garments, and use disinfected water, for hands, unsparingly. Physicians and clergymen should be provided with disinfected water for their hands on leaving the sick room.

Fifth. All scraps of linen used in receiving discharges from the mouth or nose should be immediately burned. All receptacles for filth should be thoroughly disinfected.

Sixth. CHILDREN should not be allowed to attend the funerals of those dying from diphtheria. Disinfectants should be used freely in the room and about the body while it remains unburied. The coffin should never be opened at funerals to expose the dead to the public.

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DISINFECTANTS.

The following disinfectants are recommended by the Board:

FOR DISINFECTING PRIVIES, ASH-PITS, CESSPOOLS, DRAINS, AND OTHER OFFENSIVE PLACES.

Fifty pounds of copperas (sulphate of iron, green vitriol) to a barrel of water.

This may be dissolved in a smaller quantity of water, and then diluted. It may be used freely and repeated as often as odors arise. It is cheap and efficient. About four gallons are required to disinfect an ordinary vault used by one family. A smaller quantity may then be poured in occasionally.

FOR SINK-PIPES AND WATER-CLOSETS.

One pound of nitrate of lead to a gallon of water. Use freely.

FOR ARTICLES OF CLOTHING, ETC., USED ABOUT THE PATIENT.

Sulphate of zinc, eight ounces, crude carbolic acid, one ounce, warm water, four gallons.

Throw all articles of body linen, sheets, etc., at once into this solution and boil in clear water. In malignant cases such articles should be boiled in this solution, diluted with an equal quantity of water, previous to boiling in soap and water. It can be used freely in the sick-room. It does not stain. A towel may be wet with it and hung in the room. A sheet may be hung across the entrance hall or door and kept constantly wet with it. Nurses and attendants will find it well to occasionally wash their hands in this fluid.

Bromo-chloralum, diluted with eight or ten parts of water, can be used in the sick-room for wetting towels and sheets, as above described, and for washing the hands, when the odor of carbolic acid is offensive, as it is odorless.

4th. By securing correspondents in every town in the State, who are intelligently interested in sanitary subjects, or willing to become so, and who will act as a medium of communication between us and the people, as sanitary reporters concerning prevalent diseases and all local conditions relating to health, and aid in securing a sanitary history of each place, to be kept continuous hereafter by the aid of such reports and the mortality returns. Correspondents have already been secured in most of the towns of the State. Blanks 1 and 2, for country and village, commence the sanitary history, and the following postal card blank serves for regular correspondence concerning prevalent diseases. This system of correspondence is of course a permanent and important part of the organization of the Board, and inseparably connected with its successful working:

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Estimated Population,

REPORT FOR

for the *ending* *187*

DISEASES.	Prevalence and Severity.	No. of Deaths.
1 Small-Pox,		
2 Scarlet Fever or Scarlatina,		
3 Diphtheria,		
4 Typhoid Fever,		
5 Intermittent Fever,		
6 Typho-Malarial Fever,		
7 Cholera Infantum,		
8 Cerebro-spinal Meningitis,		
9 Croup,		
10 Whooping Cough,		
11 Dysentery,		
12 Diarrhœal Diseases,		
13 Consumption,		
14 Acute Lung Diseases,		
Total number of Deaths,		

[Please note UNUSUAL causes not specified and the PREVALENCE OF ANY DISEASE, as far as you know of them. Give approximate number of cases. Indicate severity by † if more than usual; by — if less.]

REMARKS.

Signature.

STATE BOARD OF HEALTH.

BLANK No. 1.

Town of *187*

Reporter.

1. Estimated population.
2. Estimated number of acres.
3. Principal occupations of inhabitants.
4. Trades or manufactures carried on.
5. Principal crops raised.
6. Principal fruits cultivated.
7. Average acreage of woodland.
8. Principal kinds of timber.
9. Nature of soil.*

* Clay, sandy, gravelly, etc.

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10. Favorable or not for natural drainage.
11. Estimate acres of low, wet, undrained land.
    Swamps and marshes.
12. Estimate number of acres drained during last five years.
13. Disturbance of natural drainage by reservoirs, dams, embankments, or excavations.
14. Note any disturbance of health following.
15. Streams, ponds, and other bodies of water.
16. Bodies of stagnant water.
17. Beds of what streams or ponds are dry, wholly or partially, and during what periods?
18. What are the ordinary diseases?*
19. Sources of drinking water.
20. Quality of water (whether hard or soft, and other qualities).
21. Average depth of wells. Shallowest. Deepest. No. of artesian.
22. Average distance of privies from wells. Least.
23. Average distance of outlet of sink-drain from well. Least.
24. Average distance of outlet of sink-drain from house.
25. Condition of privies connected with school-houses.
26. Number of paupers, and how cared for.
27. Mention what, in your opinion, are the principal sources of danger to life and health, and any unsanitary conditions that exist and are likely to produce disease.
28. Mention any unusual cases or forms of sickness.
29. How completely are the registration laws concerning births, marriages, and deaths, observed?
30. What proportion of births occur without the attendance of a physician, and how can the registration of these be secured?

STATE BOARD OF HEALTH.

BLANK NO. 2.

Town of *187*

Reporter.

1. Estimated population.
2. Nationalities represented: estimated proportion.
   Estimate number living in tenement houses.*
   " " " boarding houses.
3. Trades or manufactures.
4. Health of employees: mention any liabilities to disease incurred.
5. Number families in a tenement house: average. Greatest. Least.
   Number of employees living in cottages.
6. Estimated number employees in each branch.
7. Nature of soil.†
8. What provisons for drainage, carrying off surface water?

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* In order of prevalence.

† A house occupied by three families is considered a tenement house.

‡ Clay, sandy, gravelly, etc.

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9. Natural drainage: streams, rivers, &c.
10. Ponds and bodies of stagnant water.
11. Beds of streams, ponds, &c., dry or partially, and during what periods?
12. Area drained by sewers.
    Number of miles of sewers.
13. Sewers empty into what?

    If no sewers, give relations of privies and sink drains to wells, as to distance and natural drainage.

14. Sources of drinking water.
15. Quality of water (whether hard or soft, and other qualities).
16. Average depth of wells.
    No. of Artesian.
17. Number of cisterns used for drinking water.
    Number provided with filters.
18. House refuse and filth: how disposed of?
19. Is there any local health organization?
20. If so, is it active and efficient?
21. Condition of privies, water closets, etc., connected with school-houses.
22. Number of paupers, and manner of support.
23. Public institutions for charity or correction.
24. Mention principal diseases prevalent.
25. Principal sources of danger to life and health.
26. How completely are the registration laws observed?
27. What improvements are most needed?
28. Sources of artificial illumination.

5th. By means of lectures on sanitary subjects adapted to the requirements of each locality. This work, commenced but lately, will be followed more extensively during the present winter.

6th. By monthly reports of the sanitary condition of the State, and the prevalent diseases, with such suggestions as these warrant and illustrate. The *mortality* reports are at present confined to Hartford and New Haven, and it was not until September, after persistent effort, that such report could be secured from Hartford, so imperfectly are the registration laws observed. It is hoped that more extensive reports can be secured next year.

This preliminary statement explains the general work determined upon by the board for the first half year. The specialized work will be found under the proceedings and special reports.

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PROCEEDINGS

of the Connecticut State Board of Health and Bureau of Vital Statistics for the five months ending November 30th, 1878.

The following gentlemen were appointed by His Excellency Governor Hubbard, and approved by the Senate in accordance with the act of March 27, 1878:

Dr. J. S. Butler, Hartford, two years.
A. C. Lippitt, New London, two years.
A. E. Burr, Hartford, four years.
Dr. R. Hubbard, Bridgeport, four years.
Dr. C. A. Lindsley, New Haven, six years.
Prof. W. H. Brewer, New Haven, six years.

A preliminary session for completing the organization of the Board was held April 9th, at the U. S. Hotel, Hartford.

Dr. Lindsley was chosen secretary of the meeting, Dr. J. S. Butler of Hartford, was elected president for 1878–9, and Dr. C. W. Chamberlain of Hartford, permanent secretary.

Dr. Butler addressed the Board substantially as follows:

Gentlemen,—There is such a remarkable ignorance even among the more intelligent classes of the community in regard to the general laws of hygiene, that it becomes the first duty of the State Board of Health to take measures to enlighten the public mind, not only upon some of the main principles, but upon not a few of the details of public hygiene, or "State Preventive Medicine." This can be best effected,

1st. By lectures from members of the Board and others on general and special topics.

2d. By meetings for discussion of these topics, in various parts of the State.

3d. By delegations to the meetings of the various county medical societies.

4th. By distribution to every physician in the State, of reports and papers on sanitary subjects—such, for instance, as Dr. Daggett's and Dr. Lindsley's, in the Report of the New Haven Board of Health.

And, above all other means, by inducing every newspaper in the State to insert brief, compact, and frequent articles, showing what State preventive medicine is, its aims, duties, and necessities, in its various departments, and to see to it that such articles are duly prepared. We have ever found the press ready to give the aid of its great power to such humane objects.

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By these and other means the Board must seek so to instruct and interest the public mind generally, and especially the medical profession, as among other results, to insure the establishment of an efficient Board of Health in every city and town in the State.

It is suggested that some of the most important topics be assigned to different members of this Board, to be reported upon at some future meeting, in such brief form as to admit, when printed, of cheap and general distribution, and to insure as far as possible the perusal of such reports by all, even the busiest man and woman in the State.

A general discussion of the topics suggested in the address followed, and of the methods best adapted to render this organization of practical utility to the people. With reference to that point in the address, on motion of Prof. Brewer the secretary was directed to address direct communications to the various medical organizations in the State, inviting their coöperation.

On motion of Mr. Burr, the secretary was directed to correspond with other State Boards of Health, and authorized to visit, personally, any societies or neighboring State Boards, if the interests and working of this Board would be directly promoted thereby.

On motion of Dr. Lindsley the secretary was directed to prepare a circular letter to registrars, advising them of the changes in the law, with such instructions as were necessary, and to report at the next meeting.

The following standing committees were then appointed:

On State Medicine and Public Hygiene—Dr. J. S. Butler.

Sanitary Legislation—A. C. Lippitt.

Protection of Buildings from the Gases of Decay—Prof. W. H. Brewer.

Vital Statistics—Prof. C. A. Lindsley, Dr. C. W. Chamberlain, *ex officio*.

Pollution of Rivers and Water Supply—Prof. W. H. Brewer.

Epidemic, Endemic, and Contagious Diseases—Dr. R. Hubbard, Dr. C. W. Chamberlain, Prof. C. A. Lindsley.

On By-Laws and Regulations—Dr. J. S. Butler, Dr. C. W. Chamberlain.

A preliminary session was held June 20th, at 2.30 P. M. Present, Drs. Butler, Lindsley, Prof. Brewer, A. E. Burr, A. C. Lippitt, and Dr. C. W. Chamberlain. The minutes of the preceding session were read and approved.

The secretary reported a plan for a postal-card system of correspondence, prepared to serve both as a return of the mortality

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and of prevalent diseases. The irregularity with which returns were made to the registrars rendered both systems necessary.

The following draft of a letter sent to the various medical societies was presented:

Gentlemen of the *Medical Society:*

As known to most of you, the Legislature, at the last session, passed the Act creating a State Board of Health and Bureau of Vital Satistics, thus adding this State to the number recognizing the value of the aid rational medicine can give in securing true prosperity to the State. The majority of the States of the Union now possess such organizations, and the number is yearly increasing. The success of this Board must at the outset depend largely upon the hearty coöperation of the physicians, not only individually but in their associated action and in their relations to society. We earnestly commend the subject to your consideration and discussion, and would suggest that you appoint a Committee on Public Hygiene to act more directly as our auxiliaries. We ask also your individual assistance as correspondents, and in securing prompt and regular returns of vital statistics. We also take this opportunity of soliciting careful attention and prompt replies to such circulars of inquiry as may be sent from the Board from time to time.

By order of the Board,

C. W. CHAMBERLAIN, M. D.,
Secretary.

The following circular was sent to registrars throught the State:

[Circular No. 1.]

STATE OF CONNECTICUT.

HARTFORD, CONN., June, 1878.

To the Registrars of the State of Connecticut:

Gentlemen,—As you are probably aware, the superintendence of the system of Registration of Vital Statistics passes into the hands of the State Board of Health July 1, 1878. All applications for blanks after that date, and for record books, forms for abstracts, etc., should be addressed to the Secretary State Board of Health. We desire your hearty coöperation in our endeavors to secure a better execution of the registration laws and a complete return of the vital statistics of the State. The especial points we ask your immediate attention to are these, and we will do all in our power to assist in their accomplishment:

1. To secure prompt returns, every month, of births, marriages, and deaths, as the law directs.

2. To diminish the number of deaths reported as from "cause not stated" or "ill-defined" which forms too large a proportion of our returns. If the cause of death be not stated, the reason why it is not stated should be given, and no incomplete certificates should be accepted when possible to secure the facts required by law.

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We desire regular correspondents among the registrars concerning not only vital statistics, but all matters relating to public hygiene. All stationery, blanks, etc., for this purpose, will be furnished by the Board. Any person, interested in sanitary matters, who can thus aid us, are requested to send names to the secretary, and any suggestions concerning their localities that may be of use to the Board.

C. W. CHAMBERLAIN, M.D.,
Secretary State Board of Health.

A quarterly meeting of the State Board of Health was held July 6, 1878, at 2:30 P. M. Present, Drs. Butler, Lindsley, Hubbard, and Chamberlain, and Prof. W. H. Brewer.

On motion of Dr. Hubbard, the proceedings of the preliminary sessions were ratified.

Dr. C. W. Chamberlain was elected treasurer, and Dr. J. S. Butler, Prof. W. H. Brewer, and the treasurer were elected as financial committee.

The following By-Laws were reported, and adopted unanimously:

BY-LAWS AND REGULATIONS.

No paper shall be published in the annual reports unless ordered by a majority vote. All papers shall be published over the author's signature, who shall be considered as responsible for all statements of facts and opinions therein contained.

No bills shall be paid unless endorsed by two members of the financial committee.

The Secretary shall prepare and submit to the board from time to time such general and special circulars as he may deem expedient.

Any member or committee appointed for any special purpose by the board shall have free use of all blanks, forms, etc., requisite for use in securing such object, and the Secretary may extend such courtesy to any one not a member of the board who will give the right of the publication of his researches to this board, provided that such researches be directly connected with the work of this board in some of its departments.

The election of those officers which are chosen annually shall be held in January.

The following shall be the regular order of business in the stated meetings of the board:

ORDER OF BUSINESS.

1. Reading Minutes of Last Meeting.
2. Reading Communications.
3. Report of Secretary.
4. Reports of Committees.
5. Business left over.
6. New and Miscellaneous Business.

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Dr. Hubbard presented a plan for studying the diseases prevalent in any place, with reference to area of sewerage, altitude, drainage, soil, etc. It was voted that Dr. Hubbard prepare a report for the city of Bridgeport upon such a basis.

Upon motion of Professor Brewer, the secretary was directed to prepare a digest of the requirements of the registration laws for general circulation.

The pamphlet on diphtheria was submitted by the secretary, and after discussion and amendment, ordered printed for general distribution.

The committee on vital statistics presented a form of death certificate, which, after discussion and amendment, was adopted as follows:

STATE OF CONNECTICUT.

CERTIFICATE OF DEATH.

To be returned to the Registrar of the Town in which the Death occurred within the first week of the month after death.

I certify, from the best information which I can obtain, that

1. Name, in full.

[Maiden name, if a married woman or widow.]

2. Place of Death, Town, No. Street.

[If a tenement house, by how many families inhabited.]

3. Date of death.
4. Age, Years, Months, Days.
5. Sex, Color, or Race.*
6. Single, married, or widowed.†
7. Birthplace, Town, State or Country.
8. Residence at time of death, Town, State or Country.
9. Occupation.
10. Name of Father.
11. Name of Mother.
12. Birthplace of Father, Town, State or Country.
13. Birthplace of Mother, " " "
14. Duration of Disease.
15. Disease or cause of Death, First or Primary, Secondary (if any.)

Signature and address of attending Physician or other person making the return.

Dated at this day of 187

[Be very particular to fill all blanks.]

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*If other than white.—(A.) African; (M.) Mulatto; (I.) Indian. If other races, specify what.

†If a Married Female or Widow, state of whom she was the Wife or Widow.

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The attention of physicians is earnestly invited to the following list of diseases, in reference to which the particulars specified are essential to the *proper classification* of causes of death, and consequently to the *accuracy* and *usefulness* of our statistics of mortality. It is respectfully suggested that a *negative* statement is often as important as positive one—for instance. "Abortion—at two months—Metritis—no cause discoverable." "Cancer of Stomach—not hereditary, as far as known." "Erysipelas of Head—not of traumatic origin." "Gangrene of Leg—no definite cause." "Metritis—not puerperal." "Small-pox—patient never vaccinated." "Ovarian Tumor—no operation, etc." By secondary is meant the immediate cause of death,—e. g., hemorrhage,—in consumption; phthisis would be the primary hemoptysis the secondary cause of death,—meningitis or congestion of the brain the secondary, cholera infantum the primary, etc.

Abcesses—Location and cause, if any.

† Aneurism—Vessel involved, and mode of death. Whether operation.

* Abortion and Miscarriage—Cause, mode of death, and period of gestation.

Cerebro-Spinal-Meningitis—Variety, whether probably Zymotic (Cerebro-Spinal Fever), or a simple inflammation.

Childbirth—Circumstance producing death.

Cancer—Variety and seat; whether hereditary or not.

† Calculus—Mode of death; whether after operation, and if so, what one.

Carbuncle—Location.

Congestive Fever—Variety.

Continued Fever—Whether simple continued fever or other variety.

Dentition—Mode of death.

Disease of Heart—Variety. Valves involved, if any.

Dropsy—Variety and cause.

Enteritis and Gastro-Enteritis—Cause if known; whether Diarrhœal or not.

* Erysipelas—Seat and cause; if Traumatic, how produced.

* Fractures—Cause and mode of death. (State nature of accident, etc., clearly.)

* Gangrene—Seat and cause.

Gastric Fever—Whether Remittent, Typhoid, etc., or simple Gastritis.

Gastritis—Whether simple or from a definite cause.

† Hernia—Variety and mode of death; whether any operation.

Insanity—Variety and mode of death.

Intermittent Fever—Variety, as Quotidian, Tertian, etc.

Jaundice—Cause.

Malarial Fever—Variety.

Malignant Pustule—Location and cause; whether probably dependent on contagion or not.

Malformation (Congenital)—Variety.

Metritis—Variety and cause; (whether Puerperal or not.)

Necrosis and Caries—Seat, original cause, and mode of death.

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†Ovarian Tumor—Mode of death; whether operation.

Paralysis—Variety and cause.

*Peritonitis—Variety; whether simple, puerperal, traumatic, etc., and if the last, how produced.

Phlebitis—Cause; seat and variety.

*Pyæmia—Cause; nature of antecedent injury, if any, and how produced.

*Premature Birth—Probable cause; fœtal age.

Preternatural or Abnormal Birth—Manner of.

Small-pox—How often, and when patient Vaccinated.

Syphilis—Variety, chief location, and mode of death.

*Tetanus—Whether idiopathic or traumatic. Nature of antecedent injury, if any, and how produced.

†Tumor—Location, variety and mode of death; whether operation.

Ulcers—Nature; chief location and mode of death.

Uræmia—Cause or associate affection. Whether puerperal.

*Wounds—Cause, variety, seat, and mode of death.

*Particularize any *Accident or other violent cause* leading to death, and *character or injury.*

†Specify every *Surgical Operation* with fatal results, and state the disease which necessitated it.

Mention intemperance whenever recognized as having produced or complicated the direct cause of death. Give as many particulars as possible instances of rare diseases, such as hydrophobia, glanders, etc.

REGISTRATION OF BIRTHS, MARRIAGES, AND DEATHS.

Digest of Laws.

It shall be the duty of the State Board of Health to have the general supervision of the State system of registration of births, marriages, and deaths. Said Board shall prepare the necessary methods and forms for obtaining and preserving such records. The Secretary of said Board of Health shall be the Superintendent of Registration of Vital Statistics. [See Public Acts, 1878.]

BIRTHS.

Every physician or midwife shall, before or during the first week of the month next succeeding such birth, furnish the registrar of the town wherein such birth may have taken place, a certificate properly filled out and signed by such physician or midwife.

DEATHS.

The physician who shall attend any deceased person, shall, before or during the first week of the month next succeeding such decease, leave with the registrar a certificate of death properly filled and signed.

Every sexton or other person having charge of a cemetery or other place of burial, shall, during the first week of every month, return to the registrar a list of all the interments, disinterments, or removals made by him during the month next preceding, with the dates thereof.

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MARRIAGES.

Every person who shall join any persons in marriage, shall return a certificate to the registrar, properly made out and signed, before or during the first week of the month next succeeding such marriage.

PENALTIES FOR VIOLATION.

Every person who shall violate any of the provisions relating to the registration of births, marriages, and deaths, shall pay for every offense a fine of ten dollars to the use of the town wherein such offense is committed.

TOWN BY-LAWS.

Any town or city may enact by-laws not contrary to law more effectually to obtain a perfect registration of births, marriages, and deaths, and the registrar of the town in which such by-laws may be enacted shall execute these provisions under the same oath and penalty as if they were the statute laws of the State.*

The following instructions have been sent to the registrars by the State Board of Health:

1. To secure prompt returns, every month, of births, marriages, and deaths, as the law directs.

2. To diminish the number of deaths reported as from "cause not stated" or "ill-defined," which form too large a proportion of our returns. If the cause of death be not stated, the reason why it is not stated should be given, and no certificates incomplete in any essential point shall be accepted when possible to secure the facts required by law.

The attention of all concerned in the performance of these duties is urgently requested, and it would seem that the plain statement of the requirements of the law, and the recognized importance in all civilized communities of its prompt and regular observance, would secure its fulfillment, as is indeed generally the case in this State.

The registrars are hereby instructed to institute proceedings against all those who *wilfully neglect or who refuse* to observe the plain requirements of the law. As will be seen, it is the sworn duty of the registrars to execute these laws, and all good and law-abiding citizens are called upon to throw as little embarrassment in the way as possible.

By order State Board of Health,

C. W. CHAMBERLAIN,
Secretary and Supt. of Vital Statistics.

A quarterly meeting was held Oct. 16, 1878, present, Drs. Butler, Lindsley, and Chamberlain, and Prof. W. H. Brewer. A telegram was received from Dr. Hubbard, stating that he had been sum-

* In accordance with this law, New Haven, Hartford, and perhaps other towns, have enacted by-laws by which more prompt returns of deaths are secured.

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moned as a witness in a trial then pending. Communications were presented from Guilford relating to the typhoid fever prevalent there among the members of the Guilford Battery recently encamped at Niantic. Thirteen out of twenty men were sick, and there had been two deaths. No other cases were known in Guilford, or in others of the militia who had been encamped. Drs. Lindsley and Chamberlain were appointed to investigate the origin of the trouble.

The following letter was read by the secretary:

LAW OFFICE OF JOHN H. GLOVER,
No. 110 BROADWAY, NEW YORK, Sept. 27, 1878.

My Dear Sir,—As owner of a residence and property in the town of Fairfield, Conn., I address you with reference to the drainage of said town. Some years ago the water of a pond in the center of the village was drained by the town authorities into a piece of low ground in the rear of my house. No provision was made for conveying the water from said pond, as well as drainage from other parts of the village running into the same locality, into the Sound. An old creek which in former times was the natural outlet was stopped many years since, the ditches in the low ground between my house and the beach are clogged, and they and a pond back of said beach are in a stagnant condition. A civil engineer whom I employed to examine the matter reports, after a careful survey, that a perfect drainage can be effected by a tide-gate and pipe through the sand into the Sound. A great and increasing number of cases of chills and fever and malarial complaints now prevail in the village and neighborhood. I am induced to write to you in hopes that a remedy may be suggested and enforced by your direction. Please inform me if you, or one of the members of the State Board of Health, could meet me at Fairfield to view the situation. If so, an early day would be advisable. A line addressed to my office in New York, as above, would oblige me, and I would take pleasure in meeting you on such day as might suit your convenience.

Very truly yours,

JOHN H. GLOVER.

C. A. LINDSLEY, M.D.,
Committee of State Board of Health of Connecticut.

On motion of Prof. Brewer the secretary was directed to correspond with Mr. Glover, and, if deemed expedient, investigate the alleged evil. It was also voted that upon the authentic report to the secretary of any epidemic or endemic disease requiring investigation, or upon any application from responsible citizens for sanitary work, he be authorized to enter upon such work at once, and if deemed expedient or necessary, to call special meetings of the Board.

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The secretary read a monthly sanitary report, as the first of a series of monthly reports to be published in the daily papers. The report was accepted, and the plan approved. These reports were designed to form the basis of a report on epidemic, endemic, and contagious diseases by the secretary, for each annual report.

The following form was adopted:

STATE OF CONNECTICUT.—RETURN OF A BIRTH.

To be made to the Registrar within the first week of the month next after the birth.

I certify, from the best information which I can obtain, that

1. Full name of child,
2. Place of birth,
3. Date of birth,
4. Sex of child,
5. Name of father,
6. Residence of father,
7. Occupation of father,
8. Birthplace of father (town, state or country),
9. Color* father,
10. Age of father,
11. Maiden name of mother,
12. Birthplace of mother (town, state or country),
13. Age of mother,
14. Color* of mother,
15. Number of child,
16. Number of children now living,

Remarks. If twins or illegitimate, so state.

Signature of physician or other person making the return.

Dated at , *on this* *day of* 187 .

Make a return for each child in case of twins. If stillborn, state age of fœtus.

[Be very particular to fill all blanks.]

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* If other than white.—(A.) African: (M.) Mulatto; (I.) Indian. If of other races, specify what.

The following books have been presented to the board, or purchased for its use:

Transactions Connecticut State Board of Education. Presented by the secretary, B. G. Northrop. 1871–8.

Transactions New York State Board of Charities, 1871–1878. Presented by the secretary, J. O. Fanning.

Transactions Massachusetts Bureau of Labor Statistics, 1874–

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1878; Census of Massachusetts, 1875. Presented by Carrol D. Wright.

Transactions Massachusetts Board of State Charities—Third to Fifteenth. Presented by F. D. Sanborn.

The Sanitarian, vols. 1–6.

Transactions California State Board of Health, 1st to 6th.

Transactions Michigan State Board of Health, 1877–78.

Reports of Medical Officer of the Privy Council, England—complete set.

Transactions Massachusetts State Board of Health, 1878.

General Statutes and Public Acts of Connecticut.

Hassal on Food and its Adulterations.

Bayles on House-Drainage.

Report of Board of Health of Brooklyn, N. Y., 1875–1876. Presented by J. M. Wyckoop.

Transactions State Board of Health of Wisconsin, 1876–77.

Transactions State Board of Health of Mississippi.

Report of U. S. Marine Hospital Service. J. M. Landers.

Charter and Revised Ordinances, New Haven.

Charter and Revised Ordinances, Bridgeport.

Charter and Revised Ordinances, Norwich.

Annual Reports, Meriden.

Transactions State Board of Health of Louisiana.

Transactions Board of Health of Reading, Pa.

Transactions Board of Health City of Boston.

Transactions State Board of Health of Colorado.

Transactions State Board of Health of Minnesota.

Transactions Board of Health City of New Haven.

Registration Reports City of Providence, R. I., 1874–76.

Rhode Island Registration Reports. Presented by Dr. E. M. Snow.

Blyth's Dictionary of Hygiene.

Cameron's Manual of Hygiene.

McDonald's Microscopical Examinations of Drinking-water.

On the Adulteration of Milk. H. A. Mott.

Studies on the Laws of Life. State Medicine in its Relations to Insanity—The Treatment of the Insane—Claims of the Sick Poor—The Prevention of Insanity. Presented by Dr. Nathan Allen.

Transactions Georgia State Board of Health.

Carpenter's Preventive Medicine.

Transactions Board of Health, District of Columbia.

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TREASURER'S REPORT.

EXPENDITURES TO DECEMBER 1, 1878.

Printing,	$198.21
Postage,	49.00
Traveling expenses,	64.56
Stationery,	19.95
Books,	30.00
Blanks for Vital Statistics,	34.75
Salary Secretary one quarter,	250.00
	$546.57
Cash on deposit,	203.43
	$750.00

RECEIPTS.

By Cash,	$750.00

Bills outstanding, mainly for Department of Vital Statistics, about $200.

C. W. CHAMBERLAIN, *Treasurer.*

Examined and approved.

C. A. LINDSLEY, *Auditor.*

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STATE PREVENTIVE MEDICINE.

THE FIRST ANNUAL ADDRESS

TO THE

STATE BOARD OF HEALTH

OF CONNECTICUT,

By JOHN S. BUTLER, M.D.,

LATE PHYSICIAN AND SUPERINTENDENT OF THE CONNECTICUT RETREAT FOR THE INSANE, AND HONORARY MEMBER OF THE MEDICO-PSYCHOLOGICAL ASSOCIATION OF GREAT BRITAIN,

PRESIDENT OF THE BOARD.

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"Health is the greatest of all possessions, and it is a maxim with me, that a hale cobbler is a better man than a sick king.—*Bickerstaff.*"

"A change has come over the science of medicine; with true nobleness of purpose, true medicine has been the first to strip herself of all mere pretences to cure, and has stood boldly forward to declare, as a higher philosophy, the prevention of disease. The doctrine of absolute faith in the principle of prevention includes the existence of a higher order of thought, of broad views on life and health, on diseases and their external origin, of death and its correct place in nature. . . . . The science of prevention becomes a political and a social, as well as a medical study."—*Dr. Richardson.*

"We stand now at the very dawn of the grandest epoch yet seen in the progress of medicine. While philosophically, accurately, and with the most minute skill studying by means of physiology, pathological anatomy, chemistry, the microscope, and above all, by careful clinical observation, the natural history of disease and the effects of remedies, our art at the present day looks still higher, viz., to the prevention of as well as to the cure of disease. And this is to be done by sanitary organizations throughout each State, the nation, the laity, and the profession heartily joining hands in this most noble cause. . . . If by such means one-third or more of the sickness and the suffering consequent thereto can be averted; if the rate of mortality can be very sensibly diminished, public health everywhere greatly improved, and human life prolonged, 'the glorious triumphs' predicted by Dr. John Forbes, it may truly be said, 'are being achieved.'" —*Dr. H. I. Bowditch.*

"Power can be generous. If our mechanic arts are unsurpassed in usefulness; if we have taught the river to make shoes and nails and carpets, and the bolt of heaven to write our letters like a Gillott pen, let these wonders work for honest humanity, for the poor, for justice, genius, and the public good. Let us realize that this country, the last found, is the great charity of God to the human race. . . . . Humanity asks that government shall not be ashamed to be tender and paternal, but that democratic institutions shall be more thoughtful for the interests of women, for the training of children, and for the welfare of sick and unable persons, and serious care of criminals, than was ever any the best government of the old world."—*Ralph Waldo Emerson.*

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STATE PREVENTIVE MEDICINE.

State Preventive Medicine is the now generally accepted term for what has been known as the science of public health, or hygiene. It has received various definitions; that which gives it the widest signification will best express the province which is now generally assigned to it. Dr. Mapothers, an eminent authority, defines it as "an application of the laws of physiology and general pathology to the maintenance of the health and life of communities by means of those agencies which are in common and constant use." Sander, a recent German writer, gives the definition as "the care the State may reasonably be expected to exercise over the health of the individual by himself, and in his relation to the community." Another, which I think better covers the whole ground, and is in part by Dr. Smith of New York, makes it the power to protect the people from pestilence, whether foreign or domestic; to discover and remove the causes of disease within and around their houses, to promote the general health of communities, and plainly to point out the ultimate relation between their physical condition and their moral and intellectual position. State Boards of Health are the executive officers of State Preventive Medicine—or in other words, the machinery by which its principles are applied to practice.

It is not, as is generally supposed, of modern origin, but dates back to remote antiquity. The Mosaic, the most ancient of all codes, embraces the wisest sanitary laws as a prominent part of those given for the religious guidance of the Jewish people. The remains of the aqueducts, sewers, drains, public baths, and street-pavements of ancient Rome, and the traces left in the ruins of private houses, of appliances for ventilation and drainage, many so thoroughly constructed as still to be in excellent preservation, testify to the recognition of the same laws by the Romans.

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The laws of Lycurgus, says Dr. Gairdner, are not wanting in many very pointed enactments on sanitary matters; and the importance attached by all the Greek republics and in the ideal Platonic polity, to physical culture, is well known. Thus the Jews, the Greeks, and the Romans, the most manly of all the races of mankind, owed to the temperance and simplicity of their lives and their obedience to the laws of preventive medicine, that vigor of body and energy and decision of mind which made them so invincible in war, so wise, self-reliant, and progressive in all the arts of peace, and gave them in turn the merited and proud rank of the dominant nation of the world. We learn from the Justinian Code that a corps of State Physicians was early appointed in the Roman Empire; there were ten of them in the largest towns, one to each district or subdivision; seven in towns of the second order, and five in the smaller ones. They collectively formed a college, whose duty it was to attend to the public health.

For centuries after the decadence of the Roman Empire, we trace in the history of the world no recognition of the necessity of any sanitary provision. Pure air and pure water, ventilation and drainage, and all the other essentials to health, seemed unheeded. The monk, holding in his watchful and oftentimes miserly keeping the manuscript records of our holy religion, was almost the only one who cared to clothe the naked, feed the hungry, build hospitals for the sick, and dispense sadly needed charity to the poor and suffering. The preacher of righteousness, he was generally also the illustration of personal filthiness. The causes of disease were unknown, and consequently unchecked; and the frequent and terrible epidemics which often more than decimated the nations, were considered special manifestations of the wrath of God. The history of England or of Europe gives little evidence of any material advance in this department of civilization, until the nineteenth century. Up to this time we find only the repetition of the same sad story of sensuality and apathetic ignorance, of cruel oppression and servile submission, of the absence of all human sympathy, and the measureless waste of human life.

In the advance of civilization, England was the first nation to learn that the penalties for all violation of the physical laws are as inevitable as those of the moral laws; and that all true national progress would be in proportion to the due recognition of each.

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The plague, small-pox, fever and ague, on land, the scurvy on ship-board, with other results of the universal neglect of all sanitary care, diminished the national resources and crippled the national strength. She began to realize that pestilence was no more a special visitation of Divine anger than war, and was alike to be anticipated and avoided, or wisely and efficiently met. During the last century something was done in Europe, and more especially in England, to improve the sanitary condition of the larger cities and of the more densely populated manufacturing and agricultural districts. But this, almost the first step in the modern recognition of sanitary science, was tardy and incomplete; its laws were imperfectly understood, and the efforts to apply this scanty knowledge were without intelligent system or efficiency. The epidemic of cholera in Great Britain in the year 1832, in its practical teachings and ultimate results, proved the starting-point of a great advance in hygienic reform. Its distinct and novel selections of certain peculiar localities as the best prepared and fitted for its ravages, its uniformly greater prevalence and fatality among the poor, the degraded, and the filthy, than among those classes where the comforts and the decencies of life were found, its very general avoidance of the latter until it had acquired an accumulated virulence and power by its malignant growth among the former, all united in demonstrating to the government the vital necessity of an immediate and thorough investigation into the causes and possible means of prevention of a pestilence so fatal to national prosperity and life. The right measures were promptly taken. Government commissions were appointed, thorough investigations were made, and the results, carefully and accurately collated, were at once given to the public. The very able and comprehensive governmental report published in 1842 on the sanitary condition of the laboring population of Great Britain, is universally acknowledged to be the true starting-point of modern sanitary legislation. In 1844–6, valuable reports were made by a "Health-of-towns commission," and in 1847–8, reports of a like character by a similar commission. The passage by the British Parliament of the Public Health Act of August 21, 1875, "condensing and amending the previous acts relating to public health in England," is considered by Dr. Bowditch (*our* highest authority) the most important enactment of any nation in modern times.

These reports were the results of the oftentimes imperfectly appreciated or compensated labors of a few earnest men. In this

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connection, the names of Mr. Simon, Thomas Chadwick, and Dr. William Farr (the celebrated Registrar-General of Great Britain), have especially become historical. Of the latter gentleman, Dr. Gairdner, himself of the highest authority, writes: "He found the facts of this science in a state of almost hopeless and aimless confusion, and has not only added immensely to their number and value, but has brought into them light, harmony, and order, and for the first time in the history of the science, a determinate method and an approach to scientific exactness; by his system of calculating death-rate, he has given his professional brethren an easy and useful method, and by the formation of life-tables, he has greatly facilitated the operations of life insurance." I quote this tribute to the labors of Dr. Farr, as in the great work before us it will be cheering to know the origin of the pioneer work so helpful to our own present necessities and progress. These details of that efficient combination of individual and legislative instrumentality to which we owe the great advance of sanitary science in Great Britain, as well as the increasing interest in sanitary reform throughout Christendom, will illustrate the important truth, that it is only through this union of the action of the people and the legislature, that these results, so essential to the highest civilization, can be obtained.

On the continent of Europe sanitary science is exciting much interest. The governments of most countries, especially of France, Germany and Italy, are recognizing its national importance by official action. And governmental agency sustained by that of individuals, humane societies, and scientific associations, is giving the best of promise that this great reform, so prominent in its importance, so far-reaching in its aims, so necessary to individual welfare and to national prosperity, is about to be accepted as a vital factor in the progressive civilization of the age. These claims for its high merit will not seem extravagant or unreasonable to those who have studied its obtainable results.

In this country, Massachusetts, as often in other questions of public utility and advancement, took the lead in establishing in 1869 the first State Board of Health in the United States. The history of that board is instructive. In the year 1850, Lemuel Shattuck of Boston, made a report to the legislature of Massachusetts on sanitary reform, which showed singular foresight and wisdom, but was so far in advance of his times, that as Dr. Bowditch remarks, "it fell still-born from the press." It was, how-

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ever, good seed, buried, but not dead. Twenty years afterward, through the enthusiastic and untiring efforts of Dr. Bowditch, seconded by the energetic aid of Dr. Jarvis of Dorchester, and the Hon. Thomas F. Plunkett of Pittsfield, and others, the good seed bore this good fruit—the first American State Board of Health.

It is not, I trust, tracing results back to a too remote cause, if I add that Mr. Shattuck's report also gave its inspiration to the first report of the Massachusetts Board; which was from the pen of its first secretary, the late lamented Dr. George Derby of Boston,—a most able and influential document which gave a new impulse to hygienic reform, and still remains a text-book and model for us all. The annual Reports of the Board of Health of this our neighboring State have been continued regularly since 1869. They embrace the results of extensive and careful investigations into the various departments of public health, and like the Privy Council Reports of Great Britain, form an invaluable library of reference for the help of those who are following in the path they have pointed out. The last annual report of the Massachusetts Board (for 1878), contains an important paper upon "Drainage and Health, Sewerage and the Pollution of Streams, including the draft of a Law,"—a document which gives us the result of the examination made upon these subjects by a special commission of scientific and practical men appointed by the governor of the State. This commission spared no needed time, labor, or expense, their investigations were sharp and thorough, they reached every city, and nearly every town in the State; especially every locality where they found any unusual prevalence of sickness, increased death-rate, any suspicion of sanitary neglect, or any complaint of sanitary defect or nuisance. Their report accepted by the Legislature, and sanctioned by the highest legal authorities of the State, must have great weight everywhere, especially in aiding the adjustment of the difficult, embarrassing, and conflicting claims of rights, privileges and long-time uses connected with ponds and watercourses. The increasing density of our population in city and country, and the extension of manufacturing establishments of various kinds, give an increased importance to the question, how far *any* interference with the purity and the domestic uses of water can be considered equitable or legal. The report we refer to, liberally illustrated with maps, plans, sketches, etc., is justly considered exhaustive. The valuable mass of facts and suggestions to be found in the series of reports of the Massachusetts Board is in

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that higher line of political economy, which is sure to lead a State to increased power and wealth.

Here, as in England, the most efficient of the pioneers of sanitary reform were not from the active members of the medical profession, but from the laity. What Mr. Simon and Thomas Chadwick have been and happily still are to this cause in England, Lemuel Shattuck has been in the United States. Most ably and earnestly have these leaders been seconded by the medical profession in both countries. Thus we see that this is not a subject of limited and exclusive interest, or dependent solely on the aid and sympathy of any class, for its successful inauguration or progress. It is eminently a work for the coöperation of many allied forces; the profession and the laity; the individual and the State. In this alliance alone can success be obtained; in this, it is certain.

We find one of the good-signs of the times in the rapid and widespread interest in sanitary reform, which has of late been developed in nearly all parts of the United States. State after State has caught the salutary influence of the example of Massachusetts; leading men, especially in the medical profession, are giving it their active support; the people at large are beginning to recognize the safer, better, and cheaper policy of prevention than of the cure of disease, and to understand that the causes of many of the most dangerous diseases are palpable, easily recognized, and easily avoided.

It remains for Congress to recognize the importance of this subject, and make the "Health Department" a function of the National Government; as it is only through a united and organized system that the best national results are attained.

A Department of Public Health, with a well-defined code of sanitary law, will be established when the people appreciate its far-reaching influences; that both disease and crime come from the same tap-root of pauperism which naturally springs up from the subsoil of filth and unsanitary conditions underlying all, and involving other interests than those simply of physical health. We can see no reason why a public alarm should not be as quickly given for an outbreak of epidemic disease as for an outbreak of fire, and as thorough an organization be provided to meet the one as to combat the other. It is simply the larger application of the common-sense system of prevention. We accept the axiom of military men, that the power of an army is in the health of the soldier, and though the calls for active service are brief, and it is

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to be hoped at increasingly long intervals of time, it is the accepted duty of the Secretary of War to keep up the discipline and efficiency of the army at all times. "The fighting time for which a Secretary of Health and his organization would have to prepare is daily and continuously. It would be with him as if an invading enemy were constantly to be met, and every year a great battle was to be fought."* At the present time civilization is fighting these battles all over the world, and for the most part losing them, as in that unobstructed invasion of Great Britain in 1832, by cholera, which proved so destructive of life and property, and also as, during last summer, yellow fever found free admission to our principal southern port without inspection or quarantine. That fever, once admitted, found in the accumulated filth of city, town, and country, such an abundant material for the reception and development of its poison-germs as to defy all prevention or remedy. The consequent loss of life is counted by thousands, the loss of property by millions of dollars; the desolation of households, the consequent suffering, etc., cannot be measured or counted. Cholera has of late years repeatedly visited the ports of Great Britain, and sanitary regulation has restricted it to the infected vessels. Sanitary science claims that the due enforcement of its laws, thorough, rigid quarantine and other precautions, can prevent the importation of any epidemic disease, or limit its ravages, and thus avert such fearful waste of life and property.

Having given the accepted definitions of the science of State Preventive Medicine, and a brief sketch of its rise and progress, we are brought to the questions, What are the specific duties it prescribes? What loss has been sustained by their neglect? What has it already done? What more does it propose to do? and What are its reasonable possibilities in the future?

We have seen that this science was ancient in its inception, and, though long dormant, has of late begun to obtain due recognition of its momentous importance, ranking among its numerous friends and advocates an increasing number of eminent statesmen, scientists, and philanthropists, and in all civilized countries moreover winning to its cordial support many who, from an honest misapprehension of its character and aim, were for a time indifferent or opposed. It now comes before us, claiming the power to prevent disease, prolong the duration of human life, and, in its ultimate reach, to increase the well-being and happiness of the nations. This it seeks to do

* Dr. Farr.

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by giving a higher aim and efficiency to the powers of civilization through the removal or diminution of evils which now deteriorate the race or hinder its progress.

The duties it prescribes are well defined in the succinct language of the Act creating this Board:

"The said State Board of Health shall take cognizance of the interests of health and life among the people of this State; they shall make sanitary investigations and inquire respecting the causes of disease, and especially of epidemics, the sources of mortality, and the effects of localities, employments, conditions, *ingesta*, habits and other circumstances upon the public health; and they shall collect such information in respect to these matters as may be useful in the discharge of their duties, and contribute to the promotion of health and the security of life in this State; they shall cause to be made by their Secretary, or by a Committee of the Board, inspections at such times as they may deem best, and whenever directed by the Governor or the Legislature, of all public hospitals, prisons, asylums, or other public institutions, in regard to the location, drainage, or water supply, disposal of *excreta*, heating and ventilation, and other circumstances in any way affecting the health of their inmates, and shall also suggest such remedies as they may consider suitable for the removal of all conditions detrimental to health."

These duties are also marked out by Cameron as "mainly to procure supplies of pure water, to prevent the pollution of air and water by foul liquids, gases, vapors, and dirt of all kinds; to prevent over-crowding of dwellings, to see that the houses of the laboring classes are in perfectly tenantable order, to check the sale of adulterated, diseased, or otherwise unsound food, to cleanse the streets and roads, to prevent the spread of contagious diseases, to bury the poor, to provide burial places for rich and poor, and to disinfect and to provide dwellings for artisans." The German code is still more minute and comprehensive.

It is meant furthermore, that the best knowledge bearing upon the illustrations and teachings of this science, and upon the legislative action necessary for its furtherance, shall be published in a plain and economic manner, and be freely distributed throughout the community, in order that the people may be educated in respect to the nature and causation of diseases, the means of prevention, and generally the danger of ignorance, neglect, or disobedience of the laws of hygiene." This diffusion of

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knowledge is truly the first and gravest duty of all; other measures following in due course the right discharge of this primary duty. In the words of an eminent English statesman,* "No sanitary improvement worth the name will be effective, whatever acts you pass, or whatever powers you confer upon public officers, unless you can create an intelligent interest in the matter among the people at large. The State may issue directions, municipal authorities may execute to the best of their power, inspectors may travel about, medical authorities may draw up reports, but you cannot make a population cleanly or healthy against their will, or without their intelligent coöperation. . . . This is why, of the two, sanitary instruction is even more important than sanitary legislation." At this time, when so many schemes of reform and philanthropy (falsely so-called), are dinned into the public ear, any new claim, urged not only on the people but on the government of the State for adoption and support, should of right be submitted to the sharpest scrutiny, and to the rigid requirement of satisfactory evidence.

Dr. Richardson says : †"I want strongly to enforce that it is the section of the nation which Dr. Farr classes as the domestic—the women—on whom full sanitary light requires first to fall. Health in the home is health everywhere; elsewhere it has no abiding place. I have been brought indeed by experience to the conclusion that the whole future progress of the sanitary movement rests for permanent and executive support on the women of the country. When as a physician I enter a house where there is a contagious disease, I am, of course, primarily impressed by the type of the disease and the age, strength, and condition of the sick person. From the observations made on these points I form a judgment of the possible course and termination of the disease, and at one time I should have thought such observations sufficient. Now I know them to be but partly sufficient. A glance at the appointments and arrangements and managements of the house is now necessary to make perfect the judgment. By this glance is detected what aid the physician may expect in keeping the sick in a condition most favorable for escape from death; and by this is also detected what are the chances that the affection will be confined to

* Lord Derby.

† Address on the "Future of Sanitary Science," before the Sanitary Institute of Great Britain, July, 1877.

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one sufferer or distributed to many. As a rule to which there are the rarest exceptions, the character of the judgment is hereupon dependent on the character of the presiding genius of the home, on the woman who rules over that small domain. The men of the house come and go; know little of the ins and outs of anything domestic; are guided by what they are told, and are practically of no assistance whatever. The women are conversant with every nook of the dwelling, from basement to roof; and on their knowledge, wisdom, and skill the physician rests his hopes. How important, then, how vital that they shall learn, as a part of their earliest duties, the choicest sanitary code."

As a timely illustration of the correctness of this judgment, I may be permitted to state, on the authority of Dr. Bowditch of Boston, that the movement which resulted in the establishment in Massachusetts of the first Board of Health in the United States, originated with a lady of Pittsfield, (Mrs. Thomas F. Plunkett,) who had been intimately connected with the Maplewood Seminary in that town at the time of the well-known outbreak of typhoid fever in that institution, and was an intelligent observer of those violations of sanitary law which led to such disastrous and fatal results.

In fairly measuring what sanitary science has done and can do for the people, we are to take into consideration all those powers, values, and indeed sympathies, which are the real vital elements of the State, and which must exist in due proportion to make the best whole. We are also to take the right estimate of another element of public or State property, whose full measure of worth political economists have only of late been ready to admit, the money value of each healthy life, acknowledging the soundness of that axiom of finance as well as of political economy, that public health is public wealth.

In their best conditions, air, water, food, clothing, house construction, drainage, and more indirectly soil and climate, each with individual importance and mutual relation, are positive factors of the best health assurance. This is demonstrated by that which is the ultimate standard and measurement of sanitary results,—the diminished death-rate, that diminution being in due proportion to those best conditions. In further illustration of these measurements, let us compare the sanitary condition of the people of England in the last century with that of the present time; the utter neglect, then, of drainage, sewerage, and ventilation, of purity and plenty of air

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and water, of personal cleanliness, of the removal of filth accumulations, with badly-constructed dwellings, poor and insufficient food and clothing, all leading to their natural results in the frequent recurrence of zymotic (epidemic and contagious) diseases, and the unrestrained prevalence of all other forms, with a corresponding death-rate of about 1 in 23, against about 1 in 40 at the present time; the death-rate being at all times the most reliable flood-mark of diseased conditions.

To-day, by the establishment of government boards, and the employment of able and learned men as the inspectors, "full," as Dr. Bowditch says, "of the enthusiasm and accuracy of modern science, England has made an immense stride towards having a perfect system of sanitary guardianship of the realm." The reports of her unrivalled system of statistical investigations enable us to measure with a good degree of precision what State Preventive Medicine has already accomplished there. In all the conditions above specified, especially in regard to the removal of filth, as in the recognition of the fact that the germs of vice, as well as of disease, are developed from filth, extraordinary advances have been made. Epidemics and contagious diseases have either been prevented or kept within narrow limits; some diseases have disappeared, and the frequency and fatality of others have been largely diminished. Consequently the general death-rate has fallen to a much lower figure. Of course, these conditions are not universally regarded; in many locations are found overcrowded dwellings, an abundance of filth and vice, and the neglect or defiance of all sanitary law, and consequently in such places there is no diminution, but an increase of sickness and of the death-rate,—the difference in the latter between the most healthy district and the least in the same city, varying sometimes from twelve to fifty or even sixty in 1,000. Mr. Chadwick* says: "We have gained the power of reducing the sickness and death-rate of the old cities by one-third; . . . of the death-rate in the old settled country districts to 16 or 17 in 1,000; . . . in the new districts, with complete systems of water-supply, drainage, etc., to less than one-half, or a mean rate of 10 to 1,000, and of sickness in due proportion in both; . . . in prisons and other places under sanitary control, and in the large collection of indigent and dependent children in schools and insti-

* Paper read before the British Social Science Association in 1877, on the chief results of the progress of Sanitation.

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tutions, to 3 in 1,000, or one-third of the death-rate prevalent among the general population of the same ages, while fully one-half of the diseases of the pulmonary organs in the general population may be prevented by public sanitation." Mr. Chadwick also enumerates many other points of gain and advancement. The result of these national reforms is an equal advance in the material, financial, physical, and moral power of the whole kingdom; a striking illustration of the correctness of the accepted axiom that the health of the people is the first object of good government.

We have thus dwelt upon what has been accomplished in England, as the admirable reports of the British Parliament are unrivalled in their thoroughness and fullness of detail, as well as soundness of conclusion, and are our best instructors and guides. But sanitary reform embraces a wider field; it has availed itself of the researches of science to teach us the quantities and the qualities of air demanded by the best sanitary conditions; its impurities, their sources, and the means of their detection and avoidance, as in proper heating and ventilation, and the intimate relation of these deficiencies and deteriorations to various diseases, especially in the necessities of tenement-houses, prisons, mines, schools, the rooms of the sick and the poor, the workshops of the various trades, and all places where any impediment exists to the free circulation of pure and dry air, as in rooms occupied by many, or by laboring or diseased persons.

As an illustration of these positions, Dr. Carpenter has shown that the fatality in the well-known Black Hole in Calcutta, in the prisons in which the Austrians were confined after the battle of Austerlitz, and in other well-known instances, were not caused, as has been generally supposed, by the excessive generation of carbonic acid gas, but by the "poisonous agency of the organic matter always found in air rendered fetid by the prolonged respiration and cutaneous exhalations of a crowd of human beings, and by the deficiency of the oxidation, and the consequent increase of putrescent matter in the body." It has been shown that consumption often has its origin not only from continuous exposure to dampness of the air, but also from air rendered impure by other, even healthy, persons occupying the same close or unventilated room, or what is still more dangerous, sleeping in the same bed or bedroom with a consumptive patient; for it is admitted that the air of a close and crowded room may be as effectually poisoned by

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the prolonged respiration and cutaneous exhalations even of persons in good health, as by the introduction of sewer-gas.

The specific poisons (whatever may be their ultimate form) of small-pox, typhus and scarlet fever, measles, and diphtheria, yellow fever, etc., pass off into the air and are thus diffused and communicated. Dr. Parkes, speaking of the organic substances floating in the atmosphere, and giving rise to a large class of diseases, says "that it remains to be decided in what exact condition this organic matter exists, . . . whether it is always contained in the substances discharged or thrown from the body as in small-pox, or is produced by putrefactive changes in these discharges, as is supposed to be the case in cholera and dysentery. . . . This much is known, that they differ in the readiness in which they are rendered harmless. While typhus and Oriental plague throw off a poison which, if there is due ventilation, is readily destroyed, the poison of small-pox and scarlatina, spreads in defiance of free ventilation, and retain their virulence for months." It is accepted that the air fouled by these germs of disease is the agent of their communication. The researches of science have also taught us that the water-supply demands equally careful scrutiny in regard to its purity and the abundance of its sources, whether from rain-falls, rivers, springs, or wells; the limit within which organic matters may safely be held in solution; the character of the matters thus held; the quantities necessary to be supplied for various domestic uses, cleanliness and sewerage; impurities and their origin, and the increasing danger of the pollution of any source of water supply by the filth from privies, sink-drains, cesspools, barnyards, leaky sewers, slaughter-houses, and especially of rivers and ponds from direct sewer openings, and the deposit therein of poisonous, noxious, or polluting refuse from many manufacturing establishments.

It has been proved that any continued poisonous agency in a dwelling-house, for instance an amount of sewer-gas so small as not to be perceptible to the ordinary sense of smell, or the use of well water poisoned by infiltrations from neighboring sinks, drains, privies, cesspools, sewers, etc., in so small a degree as not to affect its taste or relish, or apparent purity, may acquire such an accumulative power as ultimately to produce deleterious or even fatal effects, especially upon children and delicate or susceptible adults.

Another most important hygienic advance is the cognizance of the sanitary as well as moral evil influence of badly-constructed

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tenement and other dwelling-houses of those classes whose poverty compels them to seek the lowest rate of rent. Chambers says "that there can be no doubt that the frequency and fatality of epidemics of the middle ages were in a great measure due to unhealthy habitations; the houses were often closely packed in crowded streets, and were often built for the purposes of defense and at a sacrifice of ventilation, drainage, and light. At the present time, with all our boasted civilization, the dwellings of the poor, in our large cities, towns, and villages, are too often a disgrace to humanity." Both in this country and in England, benevolent individuals (as well as some landlords with a view to safer investment), have of late erected dwelling-houses for the poor in which the hygienic conditions of ventilation and drainage, air, water, and space, with all possible *sunlight*, dryness, and consequent cleanliness, are made to combine with rigid regulations, low rents, and unvarying promptness of payment. It is cheering to hear that an extension of this scheme is under the united consideration of wise and benevolent capitalists, and some of our most intelligent architects. It is claimed that the poor can be provided with sanitary habitations at no higher rent than they are now compelled to pay for garrets and cellars. The problem to be worked out is to construct dwelling-houses containing the best combination of domestic necessities, security of physical and moral health, cheapness of rent, and soundness of investment.

New light is also being thrown continually upon the relation between disease and other agencies, such as those of soil and climate, in the direct and marked effect of dampness and low and circumscribed localities, especially in the development of consumption. and of the cutting down of forests and belts of trees, and the breaking up or change of the surface of the ground, in the prevalence of malarial epidemics. The recent literature of the science is full of illustrations of the newly-discovered power of these, and of many other large, though less influential agencies.

It is evident that to measure aright what State preventive medicine has already effected, we must add to the money value of the lives which the accurately measured death-rate proves to have been saved by its agency, the amount saved by the diminution of expense of sickness, and that gained by the relief from suffering, and the prolongation of a healthy life, provided we can find any due exponents to express such values. When we thus review what sanitary science has already done in the better instruction of

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the people, as to the causes and the often easy means of prevention of disease in general, and especially of the national calamities of epidemics, in the decrease of sickness and its cost in money and suffering, and in a large diminution of the general death-rate, we may well be surprised at the opposition it has ever had to encounter. We look forward to the greater work it has yet to perfect, and fear that the general acceptance of its teachings, which is sure by and by to come, will demand, as in the past, the needless but terrible lessons of such epidemic visitations as the plague, cholera, yellow fever, small-pox, typhoid fever, scarlatina, diphtheria, diarrhœa, dysentery, and also the various forms of cattle-disease, to teach us by loss and affliction, that sanitary reform, in its medical, legal, and economic affinities, is as nearly allied to Christian duty as to political economy. We shall learn that it is no greater violation of the law of God to permit open-faced vice and crime to degrade the moral sense of a neighborhood than to suffer an undrained and ill-ventilated, densely and foully crowded tenement-house to propagate disease among its inmates; that the laws of heredity are not limited to the continuance of physical disorders alone, but that pauperism in the parents as naturally leads to vice and crime in the children as to disease; that moral and physical evils are alike transmissible, and may and do pass down by a well-known law of inheritance from generation to generation.

The term "State preventive medicine," in its right sense, has a wider range than is generally accepted. It is by no means limited simply to the relation of filth to disease. Ruskin founds the strongest arguments in its favor upon the axiom, that "whatever increases the length of life, increases public wealth; whatever improves health, improves morals." The moral, intellectual, and physical natures of man are of near kindred, and of mutual dependence; the ebb or flow of each alike moves the other. Especially is this seen in the connection between the sanitary condition and that trinity of evil sequences,—pauperism, vice, and crime. This relationship, in its far-reaching results, is to-day the gravest and most difficult question before the friends of good government and social progress.

I accept the distinction between honest poverty and pauperism. "The poor we have with us always," and Christian charity accepts the implied obligation in behalf of those who need our aid rather through misfortune than through their own fault. Pauperism is in chronic alliance with indolence and vice. Filth, prolific as it is

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of evil, yields the place of preëminence to pauperism; for, in some of the older cities of Europe, filth, in some quarters, appears to be almost the normal condition, without the seemingly inevitable sequence of epidemic disease.

When the Commonwealth charged this Board to take cognizance of the best interests of the health and life of its citizens, it simply expressed a broader recognition of that accepted duty which has heretofore led it to pass and enforce laws for the protection and advancement of their moral, intellectual, and material benefit, as now for their physical. It wisely establishes and supports a system of public education, indorses the departments of police and fire, regulates the movements on our railroads and highways, and, in short, reaches out its paternal carefulness (though not always in the highest wisdom) in a multitude of ways; but while doing all this, it suffers our streams and water-supplies to be polluted, does not compel vaccination, and suffers children and others from families infected with diphtheria, scarlet fever, and other contagious diseases, to enter our public conveyances, churches, schools, and social meetings, without hindrance, ignoring the fact that the infinitesimal germs of disease may be communicated, not only by contact with a diseased person, but conveyed by the clothing, and retained by the furniture of the sick-room; and tolerates, in the very heart of our cities, open sewers with obstructed flow, whose consequent settlement and putrefaction give rise to deadly miasms! In brief, we suffer pestilence to contaminate the air we breathe, and the water we drink; to walk our streets and enter our dwellings not in darkness only, but at noonday, and this without fear or protest; while we make careful provision for the alarm of the locomotive whistle and the fire-bell!*

The prevention of indiscriminate charity also has to do with the science whose vital importance I am urging. Alms-giving at the door, in the street, or elsewhere without accurate knowledge or concerted action, is a prolific source of pauperism and crime. It discourages honesty and industry, and offers a premium to indo-

*A recent act of Parliament gives the largest cities of Great Britain power to take possession of unhealthy localities and dwellings, etc., to insure sanitary conditions. It is high time that every large town and city should have the legal power to protect the health and business of its citizens, not only by the abolition of those plague-spots so often found where disease as well as pauperism, vice, and crime are freely generated, but by the isolation or quarantine of contagious diseases.

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lence and vice. It multiplies the already large and formidable array of beggars who are at war with work and wages, and feeds a host of vagrant children suffered to be destitute of the educational, moral, and religious influences of healthy homes, leaving them to the successful training of the squad-drill of the street for the higher grades of evil doing—the boy for bolder violations of law, the girl too often to recruit the ever open ranks of prostitution, that social evil whose revenges though secret are no less terrible, reaching as they sometimes do, to the "third and fourth generation." Another example is the tramp whose outrages upon the person and property, some of which through the fear and shame of the sufferer are never proclaimed, have made the revolver almost a family necessity in many outlying and thinly peopled districts.

In this connection, and alike pressing upon us, come the grave questions regarding the sale of the ballot, the safe working of free suffrage, the equitable adjustment of the rights of labor and capital, and communism, which is well defined as the political expression of irreligion, and it may be added, of uncompromising hostility to republican government, for it is evident that the fires of the Tuilleries and Pittsburg depot were lighted by the same torch and have the same signification. All these forces of social and political disturbance unite to foster antagonism of classes, and to destroy the natural kindly sympathy and the duly recognized dependence between the rich and the poor, the consumer and the producer. Communism does not originate from unsanitary, but from far deeper and more perilous conditions; yet it finds its recruits and most reckless supporters where sanitary reform is most needed. Many political economists, apparently wise and far-seeing, are of the opinion, that we may more safely ignore fire, pestilence, or even war, than these combinations in their far-reaching and disastrous results. Thus we see that state preventive medicine is neither a professional hobby used to carry out some theory of local and doubtful utility, or to advance any narrow personal ambition, nor is it a universal panacea by which all the evils of our social system are to be remedied. It seeks the common-sense application of scientific and practical knowledge to the prevention or removal of evils needlessly yet really growing out of an advanced civilization with increased density of population, diminished simplicity of living, larger factitious wants, and undue excitements. It is in these

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conditions evidently that the gravest problems of the coming years are involved.

The history of some of the most destructive of the Zymotic diseases strikingly illustrates the demands of preventive medicine.

Leprosy was so prevalent in England during the middle ages as to require a hundred regularly established Leper-Houses for its isolation. This loathsome disease is now to be met with in many countries, and its extension is only prevented by its rigid seclusion.

Scurvy is another of the destructive diseases of early times; it comes from privations and poor food, and has prevailed in armies, besieged cities, and especially on ship-board. Its ravages in former times "were most appalling, and it is estimated that more seamen perished from scurvy than from all other causes combined, whether sickness, battle, or tempest." It is said that in one year 10,000 sailors, in the navies of Great Britain, perished from this cause. Good food, vegetables, fruits, and especially vegetable acids, were found to be absolute preventives. It has, of late, again appeared, not only in the English merchant service, but on board one of the Northern discovery ships, from the culpable neglect to provide a sufficiency of these simple but effectual remedies.

The plague, a malignant kind of contagious fever, well termed one of the great historic scourges of mankind, has again appeared in Europe. This disease, historians estimate, has destroyed, during the past centuries, over 25,000,000 of human beings. It is supposed to have originated in China; under the name of the Black Death it spread through Asia and Europe in the 14th century, and invaded England in 1663–5. As late as 1720 it destroyed half the population of Marseilles, and about 1790 prevailed extensively in Russia and Poland. In 1665 the Great Plague, so graphically described by De Foe, destroyed nearly 80,000 people in London; there, as elsewhere, its ravages were unchecked; its progress was marked only by the sign of the Red Cross, and the inscription, "Lord have mercy upon us," over the doors of the infected houses, and by the cry, "bring out your dead," as the carts went from street to street collecting the death-toll of this fearful pestilence. Like a fire on the prairie, it died out for want of material to feed upon. Sanitary precautions were unknown. Its recent invasion of Europe comes naturally in the train of the privations and sufferings of war. Unknown and unlooked for by the ignorant local authorities, its first developments were unheeded. As soon

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as it was recognized, the Russian government applied energetic sanitary treatment. Scientific health-commissions with plenary powers were created, rigid inspection and quarantines were established and enforced by a cordon of troops, and infected houses and their contents were burned. Austria, Germany, France, and England have taken the alarm, and consequently all the allied forces of State preventive medicine are being arrayed against the progress of this most formidable enemy. The contrast between the passive and ignorant surrender of the olden times, and the efficient and intelligent opposition now made, is a striking illustration of the progress of Sanitary Science.

Edwin Chadwick, Esq., of London, in his address before the International Congress of Hygiene of Paris in August, 1878, says:— "At the Congress of Hygiene at Brussels, a paper was given by Professor Zidekauer, consulting physician to the Emperor of Russia, in which he compares the results of the old medical treatment used in St. Petersburg during the three successive attacks of cholera in 1836, 1848, and 1855, with our system of dealing with the premonitory symptoms which they carried out closely and satisfactorily in 1866. In the first three attacks there were not less than from 47,000 to 50,000 individuals struck with cholera, of whom not less than from 23,000 to 25,000 died, that is to say, fifty per cent. In the epidemic of 1866, from 57,000 to 60,000 inhabitants were affected with premonitory symptoms, who received immediate relief; but only 15,000 had developed cases, of whom only 3,000, or about five per cent. died. This I submit as a fair result of our system."

Small-pox is well characterized as the most loathsome and destructive pestilence that ever existed, its victims being a hundred to one that perished by the plague. For years preceding the discovery of vaccination its victims were estimated at not less than 500,000 annually in Europe alone, with one-half its present population, and those it did not kill were often deformed. Vaccination has added three years to the general average of human life all over the world, and when duly enforced, and with the use of purely bovine matter, and with due seclusion and restriction of imported or sporadic cases, this disgusting disease can be as effectually extirpated from the civilized word as scurvy or leprosy. Yet by the neglect of vaccination, isolation, and all due sanitary measures of prevention, no less than 51,034 died in Great

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Britain from small-pox in the ten years 1856–1865, and in the year 1864 alone the deaths were 9,425.*

In a paper read before the American Public Health Association in 1876, Dr. Lee of Philadelphia, gives an approximate estimation of the loss sustained by the city of Philadelphia from the presence of small-pox in the winter of 1871–2. This includes the loss by diminution of travel and traffic of railways, etc., in and out of the city, loss to inn-keepers, retail dealers, merchants, manufacturers, travelers, customers, shipping interest, laborers, etc.; adding to this the value of the loss of life, loss of labor, and cost of sickness in the 25,000 cases of disease. He makes the tax thus imposed upon the city of Philadelphia to amount to not less than $24,000,000.

In 1871–72, through similar violation of sanitary law, small-pox prevailed as an epidemic in Boston and Lowell. Over a thousand lives were heedlessly sacrificed, besides the corresponding money-loss.

In these and all preceding estimates, no attempt is made to measure the consequent suffering and burden of orphanage and widowhood.

Insanity is strictly a physical disease, and comes eminently within the range of preventive medicine. When our proposed system of State sanitary registration and report is carried out, and each case is reported in its earlier stages, we may hope to obtain a more accurate knowledge of the predisposing and exciting causes of this flood of mental disorder which is filling our lunatic hospitals faster than we can or do build them. We can also more efficiently apply the means of prevention and remedy, when we can better measure its varied pernicious causes of erroneous educational and social influences, neglect of family training to reverence and obedience, sensational reading, evil habits of body and mind, idle, aimless, or sensual life, and learn more exactly as we shall surely learn, how very early in life the predisposing causes of insanity are planted in the child. In view of the relation of insanity to general hygiene I may here present the proposition that as the healthy brain-cell is to the best mental action, so is the right sanitary home to the highest physical social life. In no department of philanthropy and science during this 19th century, has greater progress been made than in the direction of the better care and treatment of the

* Chambers' Cyclopedia.

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insane. Their condition in the last century is well described by a quaint old Scotch writer who says, "the better sort of ye mad people we leave to the care of the Chirurgeon, the baser sort to the taming of the scourge." Fifty years ago only half a dozen lunatic hospitals, and all of limited capacity, existed in the United States. To-day there are over eighty with most liberal provision for their 30,000 inmates. A greater work remains to be done, a work greater than cure or kindly care—that of prevention; a work which in order to be of the highest success, must reach back often to the early life, the family, the school, and the nursery.

The question before us to-day is, not only what can the State do for the chronic insane; but the wider and more timely question, how can we prevent insanity?

In my report for the Retreat for the Insane for 1860, I said: "Over three thousand cases of insanity have now come under my direct observation and care. In a large proportion of those whose histories I could obtain, I have found that the remote and predisposing causes of insanity could be traced to malign influences on childhood." The neglect of physical training, and the imperfect physical development which follows from this neglect, are strikingly evident in many of our female patients. The various causes which are reported to me as the sources of disease, and which are classified in the tables under the head of "ill health," "undue mental effort," "grief," "domestic unhappiness," etc., may very frequently be traced, in their primary influences, to the one cause of a want of physical stamina. We press the training of the mind, by all possible hours of study in and out of school, and by the added stimulus of emulation, while we neglect the training of the body, in disregard of that mysterious but absolute law of sympathy, which compels the debility of the latter to cripple the action of the former. My own observation leads me to think this error will be found to exist more frequently with the parents than with the more intelligent and advanced of our teachers; and its pernicious tendencies are beginning to be better appreciated. "I venture to say that not one girl in ten, now-a-days, enjoys really sound, rugged health; and surely that is a very unwelcome statement about those who are expected hereafter to be helpmates to husbands and mothers of children. . . . . Parents and teachers both, should inculcate upon children of both sexes, the importance of health-bringing, active exercise. Boys need but little urgency,

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but girls should be compelled to take it. It *is possible* for them to become of strong, vigorous health, with excellent digestion, and no nervousness.* "

In my report of 1840, I stated that of the female patients admitted during the past three years, thirty-four per cent. were the wives of farmers and mechanics—an undue proportion of the comparative number of these classes in the community. The consideration of the causes which led to this most natural result, showed that between child-bearing, nursing, the accumulation of household duties and drudgery, and the miserable short-sighted economy which often led the husband to refrain from supplying the necessary domestic assistance, the poor discouraged wife lost in turn her appetite, her sleep, and her strength; her nervous system had become prostrated, and, sinking under her burdens, she had sought refuge in the Retreat. One of our worthy female patients remarked one day to a lady, "Only think of it! they are keeping me here, and I have six children and fourteen cows to take care of at home." "Twenty excellent reasons for your remaining here until you are cured," was the timely answer. They were the twenty reasons which had made her insane. Certain it is, that a decided majority of all the cases of insanity which have come under my care during the past forty years, have arisen from easily-avoidable causes, and might therefore have been as easily prevented.

The laws of heredity are not limited simply to the transmission of disease; drunkenness, idleness, pauperism, vice, crime, come under the same laws, and may be alike propagated from parent to child; and by a well known law of sympathy, each one of these often draws one or most of the others in its train of consequences, all leading directly to the deterioration of the race.

On the other hand, and in direct opposition to this result, we find that the sanitary law of prevention which enforces the removal of those causes of loss, evolves the healthy body and healthy mind, and that marvelous power of the will over not only the insane impulse but over all those other disordered impulses which come from deficient self-control. Up to the acceptance of this law, and to the obedience of its requirements, the people must be educated;

* Gen. Oliver's Report to the Massachusetts Board of Education.

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thus making the necessary education of the race the successful antagonist of its deterioration. This is the application of the well-known Oriental legend, of the contention between Ebony and Topaz—the evil and good Genii—for the soul of the young Prince.

So long as we allow unsanitary conditions within and about dwelling-houses, so to dwarf the physical as well as the mental and moral power of the child as to prevent the best development of adults; so long as we suffer diphtheria, scarlet fever, etc., to kill the child, consumption the young man and woman, typhoid the working-man, and other alike preventable diseases to do their evil work upon the ignorantly exposed sufferer; so long as we keep the death-rate as (ignorantly or not) we do keep it, above the possible 15 or even 17 to the 1,000, then is our professed Christian civilization deplorably incomplete, and our individual duty as Christian men and women far short of the demands of the second great commandment of the Divine Law.

Dr. Farr says that civilization is to man what domestication is to the inferior animal, and that both "history and analogy justify us in believing that the higher race admits of development by some of the same means found efficacious in the lower." In man, this is accomplished by a hygienic regimen, complete from infancy and in successive generations, and consequently a gradually increasing development in each, but with a geometrical progression and ultimate attainment which, if immediate, would be wonderful.

In the solution of these hygienic problems, it is sought as far as possible to free the people, for example, from those especial enemies of the human race—hereditary disease, hereditary pauperism, and hereditary criminality; to make Consumption, the Tramp, and the Jukes family (fair exponents of these three preventable evils). no longer, as at present, the natural entail of existing circumstances; to develop in the masses, beginning with the children, not only the moral, religious, and intellectual elements, but especially that athletic power upon which alone the best whole can be built, and which in an age when all educational means were at the lowest ebb gave the world the most splendid specimens of manliness. To accomplish the great revolution in society imperfectly outlined in these pages, we must have the aid of a higher power than those simply of interested association and organization. In the solution, therefore, of this vital problem of the future of the race, and

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its nearer approach to the possible ideal revealed to us, there is a Divine factor, without whose help all our work will be in vain, but to whose promises, fulfilled in the past and awaiting our acceptance in the future, we may safely look for all needed help in the coming battle for the right before us.

The statistical investigations, especially of the English Parliamentary Commissions, have been made with such care and thoroughness that their results are universally accepted as very close approximations to the exact relations between health and disease. Some of these may well claim our gravest attention:—

It is shown that in London, which is known to be one of the healthiest cities in the world, there is annually an excess of 20,000 deaths, and, in the United Kingdom, of not less than 120,000 deaths, all from causes clearly ascertained to be preventable, and that the serious cases of sickness as clearly preventable are more than tenfold that number!

Considered as the producers of profit, men are really investments of capital, and as health is the capital of the laboring man, consequently every day of disabling sickness, and every death, is a money-loss. Dr. Farr, in the Report of the Registrar-General, says "that the minimum value of the population of the United Kingdom, men, women, and children, is, upon an average, not less than £159 ($795) a head. That is the inherent value of them as a productive money-earning race," thus making the loss caused by the 120,000 preventable deaths to amount annually to £19,000,000 (or $95,000,000). It is also demonstrated that, in addition to the fearful infantile mortality both in city and country, especially in the former, there is annually a preventable excess of 50,000 deaths, in England and Wales, during the school period of life!

In considering sickness as a most important element of loss, we must again look to the English Parliamentary Papers. In Great Britain there are many organizations under various forms and names, as "Benefit Club," "Friendly Societies," etc., which are practically Health Insurance Companies, embracing many hundreds of thousands of members of all ages. These Societies sustain themselves and make certain weekly payments to their sick and disabled members, by weekly or monthly contributions from each member. The accounts of their Treasurers take note of the time, duration, and character of each case, and thus a "full record is made of all the sickness and injuries of a very large portion of the men,

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women, and children in every part and in all the employments of the Kingdom." Dr. Jarvis states that "the government, wishing to measure the productive power of the people, gathered these records, made through many years, and placed them in the hands of the best investigators and calculators to analyze and combine them, and to show the proportion and amount of sickness that fell on male and female children and adults of every age, and in the various occupations and conditions of society. These data thus carefully and accurately gathered, showed that for every death there were two persons constantly sick; that is, for every death there were 730 (365×2) days of sickness and disability."*

The same close observations and calculations will give, also, the average value of the product and labor of each individual for the day and year. The loss by each death being given, that of each day of sickness or disability can be very nearly approached, and it is one-third of all these losses that Sanitary Science claims to have demonstrated its power to save.

Life has been compared to a line between two points—that of birth, the point of origin, that of death, the point of termination—the length of the line between being an uncertain quantity under a secret and inexorable law, over which we were ignorantly supposed to have little or no control. The history of the human race has ever testified to the incessant craving of the heart that "our days may be prolonged in the land." The Science of Preventive Medicine justifies this innate desire by demonstrating that it possesses the power to give a longer extension and a more definite and certain quantity to this line of life. We are told that "the days of our years are three score years and ten," and if we are deprived of the "residue of our years,"

* As the nation's wealth consists of the sums of all the estates within its border, the great and the small, deducting all incumbrances, mortgages, debts, etc., so the strength of the State is the sum of all the effective people, deducting all the personal incumbrances—sicknesses, disabilities, and imperfections. . . . All additions to the physical, moral, or intellectual power of individuals are additions to the energy and productive force and wisdom of the State; and, on the contrary, all deductions from these forces, whether of body or of mind; every sickness, every injury or disability, every impairment of energy, every clouding of the brain from intoxication, etc., take so much from the force of the body-politic. Collective personal gain is public gain, and aggregate personal loss is to the same extent the suffering of the community.—*Dr. Jarvis on Political Economy of Health.*

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and do so generally fall far short of that attainment, it will be well for us more carefully to regard that wonderfully-true and perfect sanitary code given to the Jewish nation and recorded for our instruction and guidance in the Holy Scriptures, and remember that through their obedience to those hygienic laws, "He increased the people greatly, and made them stronger than their enemies," and when He brought them forth out of the land of Egypt, "there was not *one* feeble person among their tribes."

Mr. Edwin Chadwick, in his Address on Health, before the British Science Association, 1877, gives a summary of the chief results obtained in the progress of sanitation in Great Britain; and I can do no better than to quote what is especially applicable to our present needs. He says:

1. That we have gained the power of reducing the sickness and death-rates in most old cities by at least one-third; or, as a rule, of reducing the death-rates in old British urban districts to 16 or 17 in 1,000.

2. That in new districts, on sites apart from old urban sites, we may, with a complete arterial system of water-supply and surface-cleansing—including measures for the prevention of over-crowding—insure reduction of death-rates to less than one-half, or to a mean rate of 10 to 1,000, and the sickness in like proportion.

3. That in well provided and well regulated institutions for children from three to fifteen years of age, we may secure them an immunity from the common children's epidemics, and reduce the death-rates to a mean of 3 in 1,000, or to less by two-thirds of the death-rates prevalent among children of those ages in the general population.

4. That in prisons and places under effective sanitary control, the death-rates (from disease) have been reduced amongst persons from the school ages and upwards to about 3 in 1,000, or to one-third of the death-rates prevalent amongst the general population of the same ages.

5. That to the persons in such institutions immunity may be given as against all ordinary epidemics, typhus, and the eruptive diseases, diarrhœa, and dysentery, which ravage the general population.

6. That amongst the general population, a reduction by full one-half of the diseases of the respiratory organs may be effected by general public sanitation.

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He says also that the possibility of all this admits of more abundant proof than he has been able to present in that address; that what has been done has been under conditions that admit of more complete and efficient repetition; and adds, it fully justifies the following recent and most important declaration of the Prime Minister of Great Britain, made in a public address in June, 1877: "I have touched upon the health of the people, and I know there are many who look upon that as an amiable but merely philanthropic subject to dwell upon; but the truth is, that the question is much deeper than it appears upon the surface. The health of the people is really the foundation upon which all their happiness and their power as a state depend. It is quite possible for a kingdom to be inhabited by an able, active population; you may have skillful manufacturers, and you may have a productive agriculture; the arts may flourish, architecture may cover your land with temples and palaces; you may have even material power to defend and support all these acquisitions; you may have arms of precision, and fleets of torpedoes; but if the population of that country is stationary or yearly diminishing; if, while it diminishes in number, it diminishes also in stature and strength, that country is ultimately doomed. And, speaking to those who, I hope, are not ashamed to say that they are proud of the empire to which they belong, and which their ancestors created, I recommend to them by all the means in their power to assist the movement that is now prevalent in the country, for improving the condition of the people by ameliorating the dwellings in which they live. The health of the people is, in my opinion, therefore, the first duty of a statesman."

Mr. Chadwick adds: "Sanitary science has had for its first stage simple ignorance and apathy; next, its stage of empiricism and half-knowledge, in which stage it is very much at present; with the common result of expensive, misfitting, inefficient, and wasteful work; with water distribution which makes good supplies bad, and bad supplies worse; with water carried into houses without the means of removing fouled and waste water, aggravating the evils of damp and of excrement-sodden sites; sewers without adjustment to the house drains; intended arteries without relation to the capillaries of the system, leaving undiminished death-rates, serving to encourage the sinister objection that sanitation is of no avail; and lastly, it has the stage of science, of complete knowledge, of unity, efficiency, and economy, tested by reduced death-rates."

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We may well have most sanguine hopes of the future when we reflect that sanitary reform practically is a question of not a quarter of a century old; that the earnest and widespread thoughtfulness upon its necessity and value is far more than a temporary excitement; and as an eminent sanitarian has said, that during this last period, short as it is, more practical work has been done to crush out and prevent disease, and more valuable papers written illustrative of public hygiene, the world over, than since the Christian era began.

The object of this paper is to give such a compendium of State preventive medicine as shall best present to the people its claims upon their confidence and support, and to show, not alone by my own observation and experience, but by the reliable evidence of the highest authorities, what it has done, what it can do, and what the highest public good demands. In support of the argument, I have made free use of Reports, foreign and domestic, and other valuable documentary evidence, not generally accessible.

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POLLUTION OF STREAMS.

By Prof. William H. Brewer,
Sheffield Scientific School, December 17, 1878.

Scientific investigation gives us each year more light and new facts relating to the influence of the waters of a place or region on its healthfulness. Year by year our knowledge increases of the amount of sickness and death caused in some way by impure water, either through its use as drinking-water or through the effect of its exhalations polluting the air we breathe.

It has been proved beyond any shadow of doubt that many diseases are spread by or through drinking-water. In several rather recent epidemics which may rank as pestilences because of their destructiveness to human life, we have certain proof that this was the medium through which the disease spread. The subject is important to the dwellers in city and country alike, and when better understood, the annual percentage of deaths in this State will be sensibly less.

There is probably not a health board in the whole world which does not find that practically, and in fact, one of the most common problems it has to deal with is the contamination of water in some way so that the health of persons is affected or imperiled, and which does not see numerous cases where disease and death are traceable to this source, either directly or indirectly.

The protection of waters, public and private, from such pollution as affects health, is no new matter; the problem of how best to do it is as old as civilization, if not indeed as old as the race. What modern science has done has been to bring out more vividly its importance, to show more definitely what the pollution is, its nature, action, and source, and to suggest remedies. The interests involved are so varied, affecting important industries as well as the health, and the necessities of getting rid of the sewage of towns, often making one community suffer that the other may be bene-

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fited, and other considerations so complicate the problem that no one line of investigation can solve all the questions that arise.

When chosen by this Board to consider the subject of "Pollution of Streams and Water Supply" in this State, I accepted with a realizing sense of the responsibility involved. I believe that what is done should begin with a better knowledge of our local conditions and local problems, rather than those general considerations which form the elementary ground-work of all work on this subject. The fragment of year I have had has been too small to allow more than the beginning of investigations, the results of which must be left for another year's report.

One function of any health board is to instruct the public in the elementary principles of public sanitation; but I am not clear in my mind how far it is advisable to attempt this through the annual reports which by law are restricted to a thousand copies. The public press is unquestionably the means by which the whole public can be most effectually reached, and it seems important that through this medium the subject of water pollution and its relations to disease should be often brought before the public.

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THE

REGISTRATION OF VITAL STATISTICS

IN

CONNECTICUT.

BY

PROF. C. A. LINDSLEY, M.D.,

NEW HAVEN.

MEDICAL DEPARTMENT, YALE COLLEGE, DECEMBER, 1878.

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REGISTRATION.

It is one of the remarkable illustrations of real progress in modern times, that up to a very recent date, in the history of civilized mankind, no visible efforts whatever were made to ascertain the number of births and deaths within a given period, or the actual population of any political organization or state. It seems surprising to us that the cultured Greeks and the practical Romans should have overlooked the great importance and the political relations of these matters. After the decline of the Greek and Roman civilization, it is quite intelligible, however, that they should be neglected through the dark period of the middle ages. Doubtless after the reviving influences of the Christian era, the subject would have received much earlier attention had not a theological element interfered and retarded any early efforts to obtain statistical information respecting the condition of the people. As in the time of Galileo, misinterpretation of the Holy Scriptures barred the progress of astronomical investigation; so for long after, certain words* of the Bible were understood to imply that any attempt to number the people was contrary to the Divine will, and would provoke the resentment of God.

It has been only in quite recent times that any have been bold enough to declare that it is not sinful to "number" the people, but a positive duty of those to whom the interests of the people are entrusted, not only to number them, but also to obtain as much other information bearing upon their physical condition as is convenient, in order that it may be best known how to promote the people's welfare.

To England, more than any other country, belongs the honor of

*1 Chron., xxi: 1. "And Satan stood up against Israel, and provoked David to number Israel." Seventh verse: "And God was displeased with this thing; therefore he smote Israel." And again, chap. xxvii., 24th verse: "Joab the son of Zeruiah began to number, but he finished not, because there fell wrath for it against Israel."

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establishing the foundation upon which is based the most successful system of the registration of births, marriages, and deaths. Whatever of the character of science belongs to the study of vital statistics, is due, in great part, to the persevering earnestness and effectiveness with which the subject has been pursued in that country.

It is the policy of the English government, when it has determined upon an important undertaking in any department of the civil service, to address itself to the execution of it by applying to it at once the means and the men which are best adapted to carry it to a successful issue. The conservative nature of their government, and their long experience, have established settled maxims and rules of legislation, by which, as a matter of course, the men for official trusts are chosen with an intelligent discrimination respecting their fitness for the duties to be imposed upon them. And they in turn, confident of the positions to which they are appointed, and not subject annually to the fickle caprices of a popular election, give their attention to the fulfilment of their trusts, as to a permanent pursuit, from which they are not liable to be ejected at the next turn of the political crank. And so they devote themselves to discharge the duties of their office with the enthusiasm and zeal arising from personal interests.

In this special branch of the civil service in England, a most remarkable progress has been made; and it is largely through the special efforts of its officers. By their own personal influence, and by their writings and addresses, diffusing the knowledge which they acquire among the people, England has advanced beyond all other countries, both in legislation respecting the vital statistics, and in their practical results. But under our government, "the best government the sun ever shone upon," the circumstances are vastly different. The uncertain tenure of office, the character of the officials, who so often hold their positions as a reward for party service rather than because of fitness for their duties, have, with other things, almost wholly divested this service of any feeling of interest or zeal in its performance. So it has too often happened that the registrars of births, marriages, and deaths have performed their duties in a perfunctory manner—indifferent to, and perhaps even ignorant of, the magnitude of the interests entrusted to them. Neglect on the part of officials has been contagious, and seriously affected those whose duty it is to furnish the registrars the facts for record. It is the lamentable truth that in almost every town in the

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State, disregard of the requirements of the law, both by physicians and clergymen, is so common as to excite no attention. Even mutual agreements are often arranged between them and the registrars, by which the methods of the law are ignored and their own adopted instead. Indeed, there are many physicians and some clergymen who wholly neglect, under any methods, to render to the registrars certificates of births, marriages, and deaths.

PUBLIC SENTIMENT—A FORCE, TO BE CULTIVATED AND UTILIZED.

The great governing power in our times is public sentiment. Legislation is an apt and ready means of carrying into effect and making practical public sentiment. But legislation opposed to public sentiment is inert, inoperative, and almost a blank.

Not only in Connecticut, but everywhere, the prominent hindrance to exact registration of vital statistics which has been encountered, is, public indifference. The people are not informed of the importance of the subject, and do not appreciate its value. The recording and preserving a few facts concerning the birth, marriage, and death of the individuals of a community does not impress the common mind with any ready appreciation of its utility. The scant attention that it occasionally attracts among the people too often only provokes the half scornful and wholly uninterested question, "What's the use of it all?" The average American citizen is eminently practical, and his never-to-be-surrendered love of liberty will not tolerate any new restrictions upon his personal actions, or the imposition of any new social duties, unless they commend themselves to his approbation by their practical utility, and their promise of results productive of personal advantage. The first most desirable thing, therefore, to bring about is the education of the said American to the just appreciation of the value of vital statistics. He must be taught to "see the use" of them. Just as soon as a fair majority of the people can be made to understand that the collection and full registration of the few particulars relating to the three great events in a human life, viz., the birth, marriage, and death, may be made the source of information which is essential to their physical and social happiness, health, and prosperity, then may success be expected. We can rely with confidence upon the expectation that our citizens are sufficiently endowed with the selfish principles of human nature to look out for their own interest when the certainty of that interest once is made plain to them.

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The Advantages of Registration of Vital Statistics.

They may be enumerated chiefly under three heads:

1. As affording a reliable record of certain events, which are often essential to be proved in establishing the rights to, or the just distribution of, property, and also as aiding by its inquisitive requirements in the detection of crime.

2. As determining the condition of the people in their social relations, and the influences which control the gradations in society, their habits and practices, and their social trend.

3. As ascertaining the sickness and mortality, with reference to the causes, and the comparative prevalence in localities, and the death rate. A fuller consideration of these points may not be unprofitable.

The Value of such Records, as Evidence, in the Protection of Individual Rights.

The vicissitudes of life are so frequent and inevitable that it is impossible to predict with certainty who of our immediate neighbors may be, in the near future, raised from poverty to affluence, or reduced from the enjoyment of luxuriant abundance to pauperism. In all the rapid and varied changes among individuals in their social relations, constantly going on about us, so much depends upon the exact facts relating to the births, marriages, and deaths of persons, regarding titles to property, and other civil and legal rights, that to a reflective mind no doubt can exist of the great value of exact registration of these three signal epochs in the life of individuals.

The accurate registration of the birth, marriage, and death of each individual is an obligation due alike from the citizen to the State, and from the State to the individual inhabitants, which ought not to require discussion, but which should be accepted as an admitted truth almost self-evident.

How often have persons failed of securing their rightful claims to property because of the broken link in the lawful evidence which such accurate registration would have infallibly supplied!

The frequency with which the registration of these events in Connecticut are called into requisition in the settlement of disputed claims is sufficient evidence of their value. The writer is not aware that any registrars have kept note of such calls upon their records, but can only state, from personal knowledge of facts in New Haven,

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that they are often the source of reliable and important information that was not otherwise attainable.

The Report for 1870 of the Board of Health of New York city, speaking of this matter, says: "There are constant applications for transcripts from the Records. These transcripts are not only used in this country, but are sent to almost all parts of the world, where they are employed as evidence in legal claims.

"On account of its great legal value, the most progressive and intelligent nations of Europe have adopted this system of registration which is highly esteemed by their citizens, as it contains a concise biography of persons holding the highest as well as the most menial positions in the land. Some idea of the value of such registration may be gained by the fact that from June 1st to Dec. 31st (seven months) there were issued from the Bureau of Registration in New York, to applicants who considered them indispensable to accomplish the purpose for which they were needed:

Transcripts from the Records of Deaths, - -	773
Transcripts from the Records of Marriages, -	157
Transcripts from the Records of Births, - -	76
Total number issued, - - - -	1,006"

In New York, the records of births and marriages are very incomplete as compared with the death records, which, in part at least, accounts for the fewer number of transcripts, the incompleteness of birth and marriage records not affording the information often sought for. These facts illustrate not only the great necessity of complete and full records, but also the still greater importance of entire accuracy as to statement, because inaccurate or erroneous records might be the means of a deprivation of property, inheritance, identity, or social standing.

If it were practicable to secure the prompt registration of the immediate facts connected with the three most important epochs in every human life, it would be the source of information not only of present, but often of far greater future value. Every birth, marriage, or death which takes place exerts an influence which concerns the interest of many others, perhaps not yours or mine now, but may sometime concern even our welfare. The complete registration of such facts, for an extended period of time, and concerning large communities, would afford a basis for generalizations, and the recognition of natural laws, productive of the most valuable

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results. The practical application of such a storehouse of facts are not limited to a single field of utility, but will be witnessed alike in their hygienic, social, and economic uses.

A Means of Detecting Crime.

Prompt and accurate registration of these events would be a direct, and frequently an effectual means of detecting crime, and indirectly of preventing it, in no small degree. Its relations to the crime of infanticide—to the practice of criminal abortions, to the detection of the frequent fatal results of quackery, and, even in some cases of willful murder, will suggest themselves to any intelligent mind.

Within the past year, in New Haven, an inhuman father was brought to justice for the criminal abuse of a young child, through the agency of the certificate of death. The child died; and by the local law of New Haven, it could not be buried until a permit was obtained from the Registrar, after presentation of the certificate of death. The marks of violence upon the child were so conspicuous, that the physician gave as the cause of death, "bodily injuries inflicted by the father."

The Registrar would not give a permit for burial on such certificate, and reported the case to the coroner. The guilty party was arrested and indicted, and is now in jail awaiting trial for murder in the second degree.

If the practice followed in some of the other towns in Connecticut had prevailed in New Haven, viz.: to bury the dead without hindrance, and let an undertaker or some one else give a certificate at the end of the year, the criminal would never have been publicly exposed or punished. Other similar instances might be adduced as occurring in New Haven, not infrequently. Such facts illustrate in the most satisfactory manner one of the uses of requiring "permits" for burial.

A Means of Studying the Influences which Govern the Social Relations and the Gradations of Society.

The registration of Vital Statistics possesses a public and permanent value far exceeding any individual and temporary importance, in solving many questions respecting the social condition of communities, and the progressive changes in the habits and practices of peoples. Its direct bearing upon the relative prevalence

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and causes of prosperity or pauperism—of high intelligence and morality, or of vice, intemperance, and degrading pursuits,—of vigorous physical development, or of feeble, low vitalized, and unsymmetrical bodily organizations, is all too obvious to require comment or illustration.

An accurate and extended registration of the great facts included in the expression, "vital statistics," would be invaluable in discovering those influences which affect society unfavorably, and not less valuable to guide and direct our efforts for the correction of such unfavorable social conditions.

It is not foreign to this branch of the subject to allude to the value of these accumulated and systematized facts, in their bearing upon the most important questions concerned in the business of life insurance and life annuity companies, in which the interests of so many families in every community are concerned. But an allusion merely to the obvious relation of vital statistics to the bases upon which these great businesses are conducted must suffice. The subject is too extended to discuss fully in this paper.

Registration in its Relations to Sickness and the Death Rate.

The third point under which the advantage of registration may be considered is, as a means of ascertaining the amount of sickness and mortality, with special reference to the causes—the comparative prevalence in localities, and the *death rate.* We all know, in a general way, something about these things. Some localities have a reputation for salubrity—others for unhealthfulness. We regard some places and circumstances as dangerous to infantile life, and others as favorable. Some places and occupations are more hostile than others to the health and lives of adults, while we recognize local influences to be favorable or otherwise to the aged, and again, in some towns and regions, one or more diseases or classes of disease are readily developed, and their progress is rapid and fatal; while in other places the same diseases do not occur, or are manageable and safe. So, too, we know that chronic diseases of various kinds are hastened or retarded in their course by the hygienic condition of different places.

These facts, and many others like them, are already known, as matters of common reputation, but our knowledge is too general and vague for practical use. What is required is, to make it definite and exact. To know by positive data how much the rep-

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utation of a given place is due to the exaggerations of Madam Rumor, prompted by the suggestions of private interests, and how much is based upon precise estimates of the healthfulness of actual residents. We must, in some sort, take the dimensions of this kind of knowledge by such means as are practicable and reliable, and estimate its true value by arithmetical computation.

No better means have yet been found than by the careful and complete registration of the causes of death, in reference to whole populations. An incomplete or inaccurate registry is always misleading and deceptive. So, too, if the registry is only partial as regards extent of territory, if full and exact in some places, and defective or wanting in others, the study of comparative salubrity is defeated.

It is an accepted fact that local influences differ much in different places and seasons. One of the grand objects of registration is to discover these influences, their differences and their results, as well as the means of controlling them. Hence registration, to be most useful, should be *general*, *full*, and *accurate*. When it is so, surprising results are sometimes obtained. Thus, in a registration report of Massachusetts, it is stated that in Suffolk County the average duration of life is only twenty years (discarding fractions), while in Hampshire and in Duke Counties, it is forty years. From the English reports on registration, we learn that a child has a chance of living forty-five years in Surrey, but only twenty-five in Liverpool.

By this system of registration, and by no other yet devised, can the life line for distinct communities be so definitely drawn. A few years ago, it was officially stated that the average duration of life in London was twenty-seven years, in Liverpool but twenty; while it was forty years in Geneva, Switzerland, and forty-one for the people of Plymouth, Massachusetts. The indications it affords of unsanitary localities are scarcely less definite, and enable the public hygienist to designate with unerring certainty, the places where pestilential disease will be first developed, and rage with greatest destruction. Shall not such facts as these arrest the attention of legislators, and give more significance to the ready question—"*what is the use of it.*"

"Diseases are more easily prevented than cured, and the first step to their prevention is the discovery of their exciting causes." Says Dr. Hobbins, of Madison, Wisconsin, "registration teaches us every day, that which every day should be brought to our

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knowledge, that we may and do, in a large measure, weave the web of our own life. That death being, for the most part, the result of influences by which we are surrounded. We have it greatly in our own power to make those influences conducive to life, or to our destruction. Our habits either make or mar us. Our eating, our drinking, our clothing, our personal cleanliness, our school-rooms, our church buildings, and even our legislative halls; the air and situation of our houses, our houses in their construction, material arrangement for heating, lighting, and ventilation—their very newness; our occupation, our education, etc.; all alike have an influence for good or for evil, and all alike come strictly within the province, within the legitimate consideration of the vital statistician."

The arguments and illustrations which might be presented, setting forth the value of systematic and thorough registration of vital statistics, are inexhaustible, and might fill volumes; but the above are sufficiently suggestive to convince intelligent minds that the interests of the people of Connecticut are involved in the successful execution of the registration laws in many ways, which most deeply concern their wealth as well as their health.

The Practical Workings of our Registration Laws.

More than a quarter of a century ago the Legislature of Connecticut appreciated how intimately the interests of the people were associated with the registration of vital statistics, and in 1852 repealed the old laws pertaining to the subject, and enacted new ones with fuller and more definite requirements. These have from time to time been modified and amended, with a view to more satisfactory results. As they stand upon the statutes to-day they are both in letter and spirit in most respects adequate to the purposes designed. But a practical difficulty has always been experienced in obtaining a ready and full compliance with them, by those upon whom are imposed the duties of giving the information to be registered. The imperfect, and in some respects valueless results, are not so much because the laws are defective in their requirements, as because the laws are not generally obeyed, and it is not made the positive duty of any officer to enforce them. Besides the registrars appointed in each town to keep the records, the duties required by the laws fall chiefly upon the members of the medical and clerical professions—who, of all men in communities, are sup-

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posed to have, both by nature and education, preëminently the intelligence which would put the highest value upon this work. While it cannot be disputed that there are many individuals in the ranks of these professions who do so esteem the work, and to whose unrewarded labors its present advance is chiefly due, yet it is to be deplored that there are a great many in both professions who treat its requirements with a tardy and careless obedience in some cases, and in others with almost entire neglect; and the writer has reliable evidence that there is in many towns in the State one or more doctors, and sometimes a minister of the gospel, who defiantly refuse obedience, and make no reports for record. The essential features of the present laws on the registration of vital statistics are, that there shall be provided and distributed to all persons who are likely to need them, blank forms for the certificates of births, marriages, and deaths. That such persons, viz., clergymen, physicians, midwives, coroners, and all who may be officially acquainted with these events, shall fill out such certificates on every occasion, and return the same to the registrar of the town in which such event occurred during the first week of the month next succeeding; also, that the registrar in every town shall record the said certificates in books prepared and furnished for that purpose. The laws also provide that the registrars in their respective towns shall obtain the same information for record whenever a birth or death has happened for which no certificate has been returned.

It is quite clear that if these laws were fully complied with by all to whom they apply, the registration of vital statistics would be so nearly perfect that the deficiencies would be almost inappreciable. The facts, however, are that in many towns the laws are so much neglected that the records for some of the most important statistical uses are wholly worthless.

To ascertain as definitely as possible what is the practical working of the laws on registration throughout the State, I issued the following questions to every registrar in the State:

NEW HAVEN, September 14, 1878.

To the Registrar of Births, Marriages, and Deaths.

DEAR SIR:

1*st Question.* Will you be kind enough to inform us whether the certificates of Births, Marriages, and Deaths in your town, returned to you, enable you to make your records complete and satisfactory?

2*d Question.* What proportion of the *causes of Death* are given by Physicians, and what by other persons?

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3d Question. Are the returns made to you monthly, as the law requires? If not, when?

Please make any suggestions which you think would secure more accurate registration.

N. B. Answer questions by number; and you will greatly oblige if you will reply within one week.

Very respectfully yours,

C. A. LINDSLEY, M. D.,
Committee of State Board of Health.

There are 167 towns, and I have received answers more or less explicit from 131 of them. From 36 towns, among which is the capital, I have received no reply. To the first question—Do the certificates returned to you enable you to make your records complete? only 63 give an affirmative answer; and 68 towns say the records are not complete and satisfactory, although many registrars speak of their personal efforts to correct the deficiencies each year before making their annual report.

To the 2d Question—What proportion of the causes of death are given by physicians? the replies from 44 towns are, "all;" from 56 towns the replies are, "mostly," or a fraction above one-half; from 16 towns the answers are expressed in fractions from $\frac{1}{2}$ to $\frac{1}{100}$; from 7 towns the indefinite word "partly," is the reply; from 3 towns, "none" of the causes of death are given by physicians. In one of these, the registrar obtains the certificates by paid agents. In another, the school committee make all the certificates, annually. Fifteen respondents do not answer this question.

To the 3d Question—Are the returns made as the law requires, monthly? only 15 registrars answer in the affirmative. In 76 towns it has been the practice to make returns only once a year. In many of these the registrars speak of the difficulty, and often of the impossibility, of getting them from the doctors. From the remaining towns the general tenor of the replies is, that the returns are irregular. In many of these towns, some physicians and clergy are prompt and accurate, and others in the same town are negligent or refuse entirely. Several correspondents speak of the frequent omission to state *all* the particulars required in the certificates. This would be an inevitable result where the returns are made only once a year; especially if the facts had to be ascertained at that time, or were stated from memory. Even when the certificates are fully made, there might be a question of their accuracy, if written at a period so long after the occurrence. And it might

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be a question, too, whether the value of the records, based upon certificates made many months after the events, and specifying so many particulars, is not entirely vitiated, as evidence in courts of justice, and thus one of the important objects of registration rendered null and void. Or is the danger greater, that if received as evidence, some error on record, by defect of memory, may defeat the ends of justice? In whatever way it is considered, there can by no valid reason for delaying the recording of events of such important consequence to individual and public interests until the facts which are to constitute the record are lost or rendered uncertain by lapse of time.

Some opinion can be formed of the results of registration in Connecticut, by a careful perusal of the following extracts from several of the correspondents who have replied to my circular. The selections are intended to exhibit the defects in the practical working of the system under the present laws. There is no arrangement of these extracts attempted, other than the alphabetical order of the towns from which they are sent. They might be more numerous, but I think they are sufficient to illustrate the facts.

Branford.—"Perhaps a more perfect registration of deaths would be had if a permit was required for every interment."

Bridgeport.—"I am very glad to get the returns by the middle of January of each year. In my opinion, the statute requiring permits to be issued by the Registrar before a body could be interred, should be reënacted—the time during which said act was in existence being the only period during which complete returns have been made by the doctors. The physicians here concur."

Clinton.—"I keep account of the deaths as they occur, and if no one hands in a certificate of death, I fill one out myself after inquiring into the case."

Colebrook.—"I have never received a certificate of birth or death from a physician in accordance with the law since I have held the office of Registrar. My records for last year I consider complete, but obtained by my own personal efforts and inquiries. The causes of death are almost entirely given by members of the family, or from my own personal knowledge."

Danbury.—"I have tried to have all the doctors report monthly, but do not succeed. I wish something could be addressed to them which would cause them to report as the law directs."

East Granby.—"I have every year except 1869 rode round the town about the 8th to the 10th of January after births and deaths. One doctor in Suffield, who has practised in this town for several years, has never

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made a return to me. Last year I had to ride around town and get three-fourths of the deaths, with the best information I could about them ; and at my age—now nearly 72—it is not desirable business. Now for suggestions: A man that holds an office and does not feel proud of discharging the duties of it, and that, too, correctly every time, is not fit to hold an office. A doctor that does not feel proud of making full and correct returns of all births and deaths where he is employed, and that, too, as required by law, ought to be exposed to the public. Let the people look at him; let every Registrar in the State report to the State Board of Health the name of every physician that fails to make returns, and have the name published annually. A law imposing a fine would avail nothing, for it would not be enforced."

East Haddam.—"The returns are very incomplete; in fact many only examine the *lists of coffins* furnished by the undertaker, and get the name and age from him, and report nothing more. I would suggest that a law be passed to the effect that if the cause of death is not filled in, and other necessary information, no fee shall be paid the physician who makes the return. I think so long as the doctor gets his twenty-five cents he does not care for the trouble of doing his whole duty. Then if it could be that the State Board could prosecute, by themselves or by agents, any neglect of duty, instead of the Registrars, it would have a good effect. Registrars are generally near neighbors to the physicians, and in country towns prefer to let the office go rather than make enemies, especially if the delinquent is the family doctor."

East Lyme.—"About half the death certificates are made out and returned by the sexton."

Enfield.—"I have to depend upon the sextons for the cause of death in one-third the cases."

Farmington.—"With regard to births, the returns are well attended to; the names of children have been very much neglected; the fault lies more with parents than with doctors or midwives. The marriage certificates are generally returned by Protestant clergymen; the Catholic priests are careless, and some marriages by them are never certified to me. Death certificates are not fully returned by physicians. Our laws are good enough. Doctors seem to be very loth to make returns of deaths."

Groton.—"Physicians make no returns in this town. By vote of the town, the School Committee of each district make returns at the close of the year, when they enumerate the children; and I think too little interest is manifested in them to meet the demand."

Guilford.—"I have more trouble to secure the names of children, so as to make a perfect record, than anything else connected with it."

Glastonbury.—"Physicians, in case of death, generally call it something; whether it is right or wrong I don't know. The worst trouble is to find out where a person dies and no doctor attends them. Doctors are very careful not to return any more than they doctor."

Kent.—"We are within a mile or two of the State of New York, and

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many births and deaths are attended by physicians over the line, who do not make any returns."

Litchfield.—"Marriages are fully reported, but only about two-thirds of the births and deaths get reported. Some of the doctors fail to send in their returns at all, notwithstanding much importunity by Town Clerk. Many cases of births are not attended by any physician, and do not get reported by any one."

Middlebury.—"A small proportion of the births and deaths occur without the attendance of any physician. These, of course, are troublesome to perfect, partly owing to the necessity of making special inquiries, and perhaps a journey, and partly from the lack of appreciation of the work on the part of the public. Town Agents hardly understand the necessity of the expense. I remember that the First Selectman, in speaking of my predecessor, said: 'He came into my neighborhood, two miles, to hunt up a case, just for the sake of a twenty-five cent fee!' If from haste or oversight the physician omits to take immediate notes, he hardly ever finds another good opportunity, and he either neglects it or he takes trouble enough to vex his generous soul."

Middlefield.—"After the certificates by physicians are in, I have usually sent a man to gather carefully the items of births and deaths in the town, and he furnishes say half the certificates, and ascertains causes as best he can."

Milford.—"What the physicians omit the sextons supply. We do not get more than ten per cent. of the given names on the birth certificates, and no provision is made for obtaining them subsequently."

Monroe.—"It is impossible to get the physicians to send in their returns, or the most of them. What shall I do if they do not make returns as the law requires?"

New Britain.—"Most of the births not reported are where the services of a midwife are employed, and it is almost impossible to know who are thus acting. I would suggest that all such be licensed, with a penalty for acting without, or that they be required to report their names to the Town Clerk or other proper officer under penalty for neglect."

Newington.—"The returns are one per cent. exactly, by physicians, the other ninety and nine I investigate."

New Milford.—"In the last ten years I have recorded 698 births in all, and there are only 108 that have a name on the record, and there are undoubtedly some births that are not returned. In the same time I have recorded 572 deaths in all, and one-third of them I took from the books of the undertaker, who informed me as to the cause of death as well as he could. About one-fourth of the one-third are recorded as unknown."

North Haven.—"Some of the physicians reside out of town. They are not particular to return their deaths at all, and some do not return births. I would suggest a law making it a penalty for a sexton to inter a body without a certificate from the Registrar, who in turn could not issue a permit without a certificate from a physician, except when no physician attended."

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Norwalk. "Two-thirds of the certificates are by physicians, the rest by undertakers. I think we could get a better registration of deaths if the undertakers had to have a permit to bury."

Norwich. "The law passed requiring a permit to bury the dead was a good one. Then you was sure of getting every case of death, but the people were very much opposed to it in the country towns, and it was repealed. If the fees for a permit had been made payable by the town, I think perhaps there would have been less objection to it."

Oxford. "I verify and correct where I do not attend. If a case is returned by a 'Homœo.' as 'Inflammation of the Bowels' when the disease was Typhoid, I class it where it belongs."

Pomfret. "I have to make enquiries at times in all the districts to make my records perfect, and expect to have every birth and death on record. The cases where no returns come in are where there are no attending physicians. It is a Connecticutism that the laws are not put into every family, and so some of them don't know the law.

Roxbury. "I would suggest for the more accurate registration of births, the passage of a law fining the fathers of all unreturned Babies $5.00, and making it the duty of registrars to collect it for their own benefit."

Somers. "The great difficulty in this matter of registration arises from the heedless manner in which some physicians fill out the blank returns, seeming not to take the trouble to fill out more than about half of the blanks on the certificates. The name of the child born is oftener omitted than inserted. I have on my records of Births for the last twenty years, 300 without a name. What a splendid record this will be for those who wish to examine them, say seventy-five or a hundred years hence! What perplexity and vexation they would encounter! Now I have not the least doubt that this great neglect to return the name exists in every town in the State. The excuse of the physician is, when he makes a monthly return, that the child has not been named; this undoubtedly is true, but he has no ground for such excuse when he *returns by the year*. I am aware the law gives the registrar the right to perfect his records at any time. But is he going to spend his time going around to get the names of births to perfect the certificates of those who receive pay for them. He will not be willing to do it without compensation. Now if he should receive twenty-five cents or so, it would be an inducement to get the names."

Stratford.—"Think the law defective in regard to payment—the Selectmen should investigate as to return made once or twice a year, and *send* to the persons making such returns a town order for amount due. A *non-resident* physician will ordinarily spend more time running after the small amount due them than receipts will pay them for." "The borough of West Stratford adjoins Bridgeport, and Bridgeport physicians practice there almost exclusively. I get not more than $\frac{50}{100}$ of their cases, which makes a defective record for about one-third of the town."

Sherman. "The certificates are returned just as it happens."

South Britain. "The returns are mostly made when I solicit them. The only trouble is, the doctors are careless in the matter, and the records would be very imperfect if the Registrar did not attend to the matter."

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Southington. "The physicians here are all very delinquent about getting in their returns."

Suffield. "In looking up genealogies I find that the record of some families are very imperfect, owing to the fact that they employ physicians out of town, and those physicians are not particular in making their returns out of their own towns."

Stonington. "In the first of January I have to devote a week, and go all over the town after the certificates, and if I get the returns in without going after them more than once, I am lucky."

Thompson. Possibly one-fourth of the causes of death are given by physicians. The Catholic Priest returns one-half of the whole. I would suggest a specific law, that towns should not pay for the certificates unless returns are made on time.

Torrington. "I am unable to make my record complete or at all satisfactory from returns of physicians. The returns are so incomplete that in January of each year I have been compelled to employ a man to canvass the town, and procure information as to births and deaths of the preceding year. I pay him twenty-five cents for each certificate, being the legal fee allowed to physicians. One physician in town I can hardly induce to make any returns at all, and those he does make are grossly defective. I find it impossible to get any returns at all from physicians residing out of the town, who have officiated at births or deaths here." "It is very evident to my mind that the system of registration required by our statutes, however good in theory, is fatally defective in practice as far as entire accuracy is concerned."

Warehouse Point. "I think more accurate returns would be secured if no fees were allowed upon certificates which are incomplete."

Waterford. "Am not able to make my records complete or satisfactory. I receive no returns monthly. I receive them only once a year, about the first of January. The most I get, I *find out by the column of deaths in the paper*, and what I know at the time of their death."

Watertown. "If means could be devised to obtain the names of children it would be a great improvement. For instance (as is possible) a father has three sons born in three successive years. When wishing to prove the age of Tom, or John, or Jim, years hence, and no names given, who can tell which is which? Physicians should be compelled (if possible) to obtain the names of infants. Now we do not get five from one hundred births."

Weston. "Physicians who reside out of town, who sometimes have cases to attend here, do not trouble themselves to make returns to the registrar."

Windsor Locks. "To secure more accurate registration it would only be necessary to enforce the law to make the returns monthly."

Wolcott. "The records are not complete. There is scarce one single instance where the cause of death is given by a physician. The returns are made with no regularity; what is done is through my exertions."

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The above statements and opinions from every part of the State, indicate clearly enough that the registration of vital statistics in Connecticut falls very far short of that completeness and accuracy which the laws upon the subject require, and aim to obtain. There is also revealed, through these correspondents, several defects in the laws, and certain positive hindrances to their successful operation, which it should be the object of further legislation to remove. It is gratifying to know that many of the Registrars, in their communications, have mentioned that since the State Board Health has issued a circular upon the subject, there has been a marked improvement in rendering the returns.

The very general failure to get a record of the names of new-born children, is a fault which demands a remedy. It is quite obvious, that under existing laws it will be impracticable for the physician to render to the Registrar the name of the child, on all his birth certificates, because so very few of them are named at the time when the law requires him to make the return. There would be some encouragement to prolong the time for returning them, to three or six months, but the testimony of my correspondents is, that the evil is not in the least abated, when the returns are made only at the end of the year, as is the general practice in seventy-six of the towns reporting to me, and to a considerable extent in many others. So that experience teaches that nothing would be gained by such a change in the law, and much would doubtless be lost by the inaccuracies and omissions in the certificates, from the attempt to state the facts so long after their occurrence. The present law, it is quite apparent, is not competent to the object—it is not adapted to the situation. It is a seeming attempt to make bricks without straw. Still, it is good so far as it goes. It should not be abolished, nor changed, only an additional provision is requisite to make it effective. Let the law continue as it is, requiring the physician to return his birth certificates monthly; because, during his professional attendance upon the mother, he can obtain all the information required by law, except the name, most easily and correctly. Then make it the duty of the Registrar to inquire personally, at a time not longer than three or six months after birth for the name of every infant born in the town for which he has the physician's certificate and upon which the name is wanting, and the Registrar shall receive for such service, and for completing the record, the sum of cents, for each name so obtained and recorded, to be paid by the town.

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The objection may be made that this will cost more. So it will, and so it should—for it involves more labor and time. The physician can not afford to do it, even for the additional fee—it is not professional work, and can be done by another as well as by him. It will pay the Registrar satisfactorily, for he will have all the babies in his town, and can do his work systematically, while each physician would have to spend a much greater time proportionally, upon the few that he has attended.

In regard to the death certificates, only one practicable method of securing them all, has yet been devised. That method is, by prohibiting the burial of the body of any deceased person without a written "permit" from the Registrar, which it shall be his duty to give, on reception of the legal certificate.

For each burial permit the Registrar shall receive a fee of cents, to be paid by the town, and shall make no charge for it to the applicant.

This has been the practice in New Haven (in compliance with a local town law), for several years. Excepting that the applicant for the burial permit pays a fee of twenty-five cents, instead of collecting the fee from the town, as for several reasons I think should be the law. It works easily and satisfactorily, and ensures complete returns for every death, and it will always be the Registrar's fault if he accepts certificates which are not properly filled out, as the law requires. It is very satisfactory to the physicians, because they are relieved of the duty of delivering their death certificates to the Registrar, and give them only on demand, to the friends of the deceased. Such a law, for a brief period, did prevail in the State, and was hastily repealed by the succeeding legislature, because it was represented to be difficult and troublesome, in the country towns, to procure the certificate and the permit before the funeral. And yet it would be entirely safe to say that one could not name a family in any country town that would not undertake five times the trouble, rather than forego the observance of the fashion of hanging a strip of black crape at the front door, while the body of the deceased friend lies in the house. Public sentiment, as I have already said, is far more potent in its tyrannical demands, than the laws which any legislature can exact.

While the laws on registration have not accomplished all that was expected, or all that they should have done, still experience fully justifies confidence in ultimate success. The undertaking is

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not hopeless, and must not be abandoned. The laws are good, and with some amendments and better provisions for their enforcement, they will be found adequate to the purpose, in their requirements. In some places in the State they have worked easily and satisfactorily.

The laws are susceptible of such amendments, and improved provision for their easy execution as will make them adequate in their requirements, and effective.

The State cannot do otherwise than go on in the effort to improve and perfect them.

Every State, and every form of organized society, has duties to perform, which are as important and imperative as those of the individual. In our present civilization, one of the recognized duties of communities is to take note and make record of whatever pertains to growth and development, or perchance to opposite results. And it is the bounden duty of well-ordered government, "to establish such a system of registration of all vital statistics of any importance, as shall enable it, both for the present and the future, to know its own life-history, and the influences that are moulding it for better or for worse, as the years pass on."

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ON

EPIDEMIC, ENDEMIC, AND CONTAGIOUS DISEASES.

BY C. W. CHAMBERLAIN, M.D.,

HARTFORD,

Member of the Advisory Committee of the American Public Health Association, Secretary of the Connecticut Medical Society, etc.,

SECRETARY OF THE BOARD.

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EPIDEMIC, ENDEMIC, AND CONTAGIOUS DISEASES.

The diseases that have prevailed extensively belonging to this class have been diphtheria, typhoid fever, diarrhœal diseases, typho-malarial fever, scarlet fever, about in the order named, and of the minor contagious diseases, mumps and whooping-cough.

The first extensive outbreak of disease that attracted attention was the epidemic of diarrhœal troubles in Hartford that followed the substitution of the river water for that from the reservoirs in West Hartford, in September. The onset was sudden, severe, and extensive, limited to the region supplied by river water, with no more than the ordinary number of diarrhœal cases common to the season in the portion not thus supplied, and in the State generally. The cases were marked by severe gastric pain, oftentimes vomiting, profuse diarrhœa, prostration, in many cases, and the recovery, when rapid, leaving an uneasy and painful condition of the bowels, lasting for weeks. In many cases the recovery was protracted, dysentery followed, and during October an unusual frequency of cases of typho-malarial and typhoid fever occurred at the proper time to have been thus caused, with a larger mortality in October from typhoid than has been reported for eighteen years, which was as far back as the records were examined. The sudden extensive and limited outbreak led to the suspicion of the water supply, as it is generally conceded that such outbreaks are due to contaminated water supply. Nearly every family in the affected district had one or more cases, and in many none escaped. The same was true of boarding-houses, where there were often from fifteen to twenty cases. Specimens of water were obtained and examined from the faucets, the reservoir of the pump-works, from the river over the inlet-pipe, and from the center of the stream, also from under a drive of logs above. That from the faucets was most impure, as it contained the sediment from the pipes stirred up by reversing the flow, which, with the other impurities, made an unsavory compound. This was very turbid, opaque at

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ten inches, while good water should be clear at eighteen, and the sediment for the most part organic matter, diatoms, animalculæ, fungi, infusoriæ, and the like, indicating putrescible matter, closely resembling ditch water; decaying fragments of vegetable tissue, and even of muscular fibre, proved incontestably sewage contamination. The chlorides and nitrites were in excess, while the permanganate of potassa test showed large quantities of albuminoid ammonia, all of which indicated a water too foul for use. The water in the reservoir was not as bad, but differed only in degree; that taken directly from over the inlet-pipe at the pumping-works showed sewage contamination, while the water in the river was comparatively pure; that from under the logs was not much worse than from the center of the river. On examination it was seen that a large sewer opened but fifty feet below the main inlet-pipe. By the tide, which rises here eighteen inches, and by an eddy the sewage was set back directly over the inlet-pipe of the water-main, and so pumped up into the water drank. This sewer, where it discharged, was an open ditch, or rather the bed of a sluggish brook into which the ditches from the north meadows emptied with a slight fall, said ditches receiving considerable sewerage along their course. Two large sewers emptied near the outlet of this brook, thus making it a kind of a trunk sewer. Although this condition of affairs had existed, with the differences hereafter noted, for many years, it had never attracted attention, as the water from the river was used only when the supply from West Hartford threatened failure, epidemics of dysentery, diarrhœal diseases among children, and cerebro-spinal meningitis might, it would seem, have suggested something wrong, but nothing ever came of it. Our city fathers, generally, have not yet quite reached the plane of appreciation of preventive medicine, so that we have but one thoroughly organized local health board in the State, although matters are fairly under way in one or two of the cities, with a promise of good results. A pier of stones recently thrown out to protect the pipes helped form the eddy, also an extensive drive of logs for miles up the river. Moreover, the water in the reservoir of the pump-works had not been let out for three years, and river water had not been exclusively used in any portion of the city for that period of time; but when pumping was done, it had been directly into the pipes to reinforce the flow. There were, therefore, the stagnant water in the reservoir, the filth in the pipes, and the sewage pumped up, to contaminate

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the quality of the water. The pumping was discontinued on remonstrance to the water commissioners, and the outlet of the sewer removed to a point below the eddy. The chairman of the city health board was enlisted in the matter, and rendered valuable assistance. It is to be hoped that a recourse to river water need never be again necessary, still it is a contingency likely to arise at any season.

The reason for escaping constant evils from this source was probably due to the dilution of the sewage when the pumps were heretofore partially relied upon, while many a case of diarrhœal or dysenteric disease might have had its origin in filth thus carried. However that may be, no one would willingly drink polluted water if he could help it. The fallacy that rivers to which sewage gains access purify themselves by flowing, has been productive of an ill-grounded sense of security. The readily oxidizable part of the sewage that gains access to a river is destroyed in the few first miles run, but the portion left is oxidizable with extreme slowness, and is only removed by vegetation or minute animal life, which latter increases in proportion as its food increases; hence water swarming with minute forms of animal life is foul, not because the animalcules, etc., are harmful necessarily in themselves, but the food which supports them is putrescible animal matter, always a source of danger; hence the microscope becomes a powerful ally in determining the sanitary purity of drinking water. These minute forms are not to be confounded with the larger forms of animal life visible to the eye, or under low powers, as these do not indicate any special impurity unless present in very large quantities, but the bacteriæ and allied forms are to be looked upon suspiciously.

Typhoid Fever.

Typhoid fever has been very prevalent in the State, in certain places, causing eighteen deaths in Hartford; its probable cause has been alluded to already. In Litchfield there were an unusual number of cases, apparently originating from contamination of soil and wells from filth which was allowed to saturate the soil beyond its power of purification. A vault used, for years, situated partially above ground on the summit of a hill, by changes in buildings was allowed to discharge by a shallow drain upon the slope of the hill. On this slope, ran a street, and here the fever commenced and raged most extensively. In the house where the

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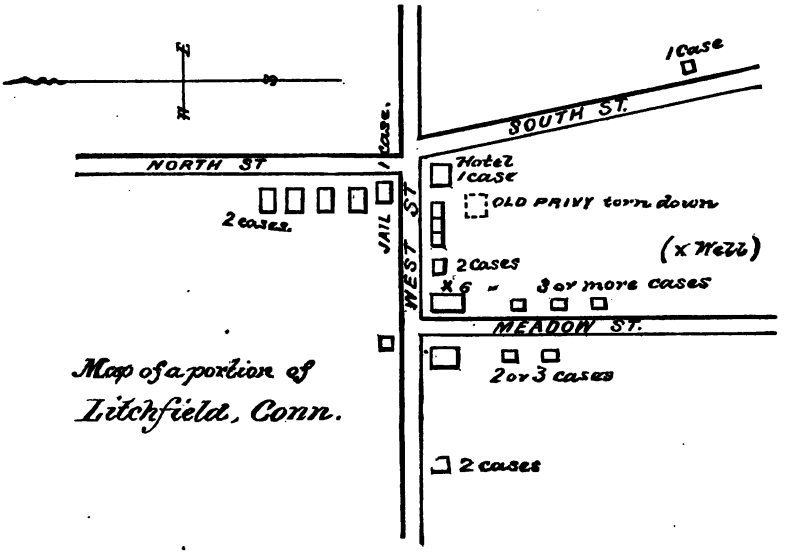
well was about fifty feet from this mass of filth there were six severe cases, and one or more cases in every family using water from that well.



The cases were for a long time confined to the side of the street nearest this drain; and cases in nearly, if not every house; later, there were cases on the other side of the street. In addition, an open ditch ran in front of these houses, and the filth from the jail deposited by a pail system on the surface was washed into this ditch to a great extent.

There were at first but few cases outside of the area thus implicated; but a disease that starts from local causes, though at first confined, soon gathers strength and invades quarters that would never have given origin to it. Thus unsanitary conditions and foul dens allowed to exist by sufferance, become a standing menace to the health of the whole community, by whose negligence or indifference they are tolerated. There is no place, however healthful its surroundings and situation, that may not suffer from a neglect of precaution in the disposal of filth, and long immunity only renders the evil more marked when it does come, as from accumulation and soil saturation, the causes for extensive trouble exist, and need only a little variation in the usual

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order—like a very dry season, for instance—to render the threatened danger an actual one. Fortunately, in this climate the frequent rains relieve us from the effects of our carelessness often; but the longer a country is settled, and the waste incidental to occupancy, and a necessary consequence of living, accumulates, less and less confidence can be placed upon the soil around our dwellings, which after awhile becomes saturated, and no longer renders the filth it receives harmless; or an excessive quantity, beyond the powers of vegetation to absorb and re-convert, may be placed upon it, air and water, one or both, become contaminated, and disease results. The diagram shows the relation of the first cases to the focus of infection.*

TYPHOID FEVER IN THE GUILFORD BATTERY.

The battery went into camp September 9th, with forty men—twenty from Guilford and vicinity—messed with Co. E of the Third regiment. Of this twenty, fourteen have had typhoid fever; two have died, and many of the cases were severe and complicated. There were no other cases connected with these in any manner, although one of Company E's men was sick, but he was taken immediately on his return home. In the first place, Guilford was thoroughly investigated, and no cause found there. The cases were scattered, and there had been no preceding case of typhoid fever, nor have there been any others, except those among the battery men and in their families. During November there were eight cases quite severe in the families of two of the men, who had been very sick with typhoid fever, and some cases in one or two others. The outbreak of the disease, on an average about two weeks from the time they left camp, also served to decide the question, that infection had been received while in camp. The food was suspected, and exonerated. The men occupied half of each table, Co. E men the other, and food was passed up and down the tables. The milk supplied was used by the whole table and by other companies also. Many of those sick had not been off the camp-ground during the encampment, and therefore could not have received infection from food or drink taken elsewhere.

The disease must then have been received in camp. The loca-

* Some changes in the charter of Litchfield have been made by which powers are granted for drainage and sewerage, which were before lacking, so that all sanitary requirements are fully and completely met.

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tion was excellent, the soil dry, naturally well drained, and no part used for tents where latrines had formerly been situated. The soil under the tents of the Guilford battery was very carefully examined, to exclude soil contamination. The latrines is use were well situated and well cared for during the encampment. In the rear of their mess-tent there was a stagnant pool of fresh water, with no natural outlet, receiving the drainage of the higher ground, where the latrines of a former encampment had been situated, and fed by an old spring about five feet deep, said to have been walled up by the Indians, and which had not been cleaned out for years.

On thrusting a stake down, it was found to be filled with a mass of putrescent vegetable matter, five feet deep, which gave forth volumes of offensive gas on stirring; its qualities and potencies needed no investigation. A specimen of water from the pool, however, was obtained and examined as to its sanitary, not chemical, qualities. Water is most vile and impure, in a sanitary sense, that contains organic matter in a putrescent or putrescible condition; and any water is considered usable for drinking that requires the addition of some such substance as sugar, and the maintenance of a temperature of 88 degrees at least for some days, in order to start fermentation; this specimen commenced to ferment on the third day, at ordinary temperature, and not in sunlight, and proceeded rapidly, giving off ill-smelling gases and developing the spores and rods which are associated with organic putrefaction, and which (or the fluid which nourishes them) are agents in inducing septic change or disease.

Now how were these men exposed to danger from this source? In the first place, this water was used to wash dishes and cooking utensils when the camp was first established, and probably vegetables at some time or other afterwards, and might have been used in making coffee, especially on the last day, when these twenty men ate separately, as they had to start earlier than the rest, or on the day of their arrival, when they ate separately. No amount of boiling will destroy the vegetable spores described above. They are indestructible at the temperature of boiling water.

This water when used was brought up in a large tin wash-boiler, which was either used to make coffee or boil vegetables—two were in use. The target-range for small arms for these men was across this pond, which brought them every day in its immediate vicinity, and to its very borders, and it is more than probable that some water was drank. As to *appearance*, the water was as good as that in the barrels supplied to the camp, and often clearer.

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But, granting that the water could produce disease, why was it typhoid? This question is easily answered. There was a case of typhoid in camp among the attendants, who had a not very well marked illness, which developed into a severe case of typhoid fever; who entered camp with malaise, and diarrhœa soon developed, remained in or about the camp until the disease was fully decided, thus furnishing the specific virus of typhoid fever, without which, many claim, no case ever occurs.

The causes predisposing these men to receive infection, supposing them to have been equally exposed as the others in camp, were, in the first place, their age. They were younger men than Co. E, for example, ranging from 18 to 30, but seven over 30, while there were none in Company E under 21, and most over 25. The average age of those sick was 21; of the dead, 19. In the second place, the fatigue of the march of twenty-four miles, and the exposures of the camp, which are, as is well-known, best borne by men from towns, who take better care of themselves than men from the farm, especially young men. There is something, too, in habit, and these boys were not as well fitted to resist as those whose lives were passed for the most part in unhealthier surrounding than any they were exposed to at Niantic.

Typho-Malarial Fever.

Typho-malarial fever, which first appears in the published mortality lists in 1877, has been quite frequent this year, though perhaps not epidemic, except in Hamden, and vicinity, where malarial fevers have attacked almost all the inhabitants of all ages, and have become endemic for several years. There were 12 deaths from typho-malarial this year in Hamden, and 9 in Derby. In Hartford, New Haven, Salisbury, and other places, it is reported as prevalent, and has been, judging from reports, more prevalent and over a wider area than last year. In Durham ten cases occurred near a large bush swamp of 50 acres, soon after it was drained. It is credited with 50 deaths against 28 last year, and has been more prevalent in New Haven and the southern portions of Fairfield counties. Malarial feveris reported as invading Norwich, Salisbury, Colchester, and some towns in Litchfield County, for the first time, that is, cases originating there.

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Diphtheria.

Diphtheria has shown a marked tendency to take on an epidemic form, to recur with increased severity, and to be accompanied by a large number of diphtheroid cases more or less severe. Children have been usually attacked, and the mortality has been almost entirely confined to them. In some instances the disease has clearly been introduced from without, and spread from one case, finally breaking out into an epidemic; in other cases it has apparently been sporadic, and due entirely to local unsanitary conditions. The history of these epidemics in towns shows conclusively that the duty of systematic attempts to protect the well from contagion is not yet fully recognized, or acted upon, nor the importance of thorough sanitary precautions.

Winsted.—The disease was introduced, apparently, by a child upon its return from Massachusetts, where diphtheria had been prevalent, and was succeeded by several cases about a week after in the immediate vicinity. These were on high ground and clean surroundings, as reported. "The outbreak of the epidemic was simultaneous with an easterly storm extremely chilly and raw, producing an unusual feeling of depression. The time of the attack was about 10 or 12 days, after which sporadic cases occurred in badly drained houses, near stagnant pools, wet cellars, etc. The disease remained in this form for about two months, when, after another easterly storm, with a similarly depressing, chilly influence, another outburst of the disease as at first, attacking children who lived in dry, well-drained houses on elevated ground, and lasting for about 10 to 12 days and as suddenly subsiding. The disease has not been as malignant as it generally is, cases did not usually reach a fatal termination before the sixth to ninth day, and death occurred almost invariably from suffocation. Since the second outbreak there has been a very remarkable number of cases of spasmodic croup, all very tractable.

The borough of Winsted is about a mile and a half in length. The fatal cases have all been in the western portion of the town. A lively stream runs through the town from west to east, which receives the drainage from many houses. Both epidemics occurred in a tract a quarter by a half a mile, destroying in all seventeen children, average ages six to eight, and all but two under ten. This is the first fatal epidemic I have been called upon to contend with, during a residence of over thirty years. Usually

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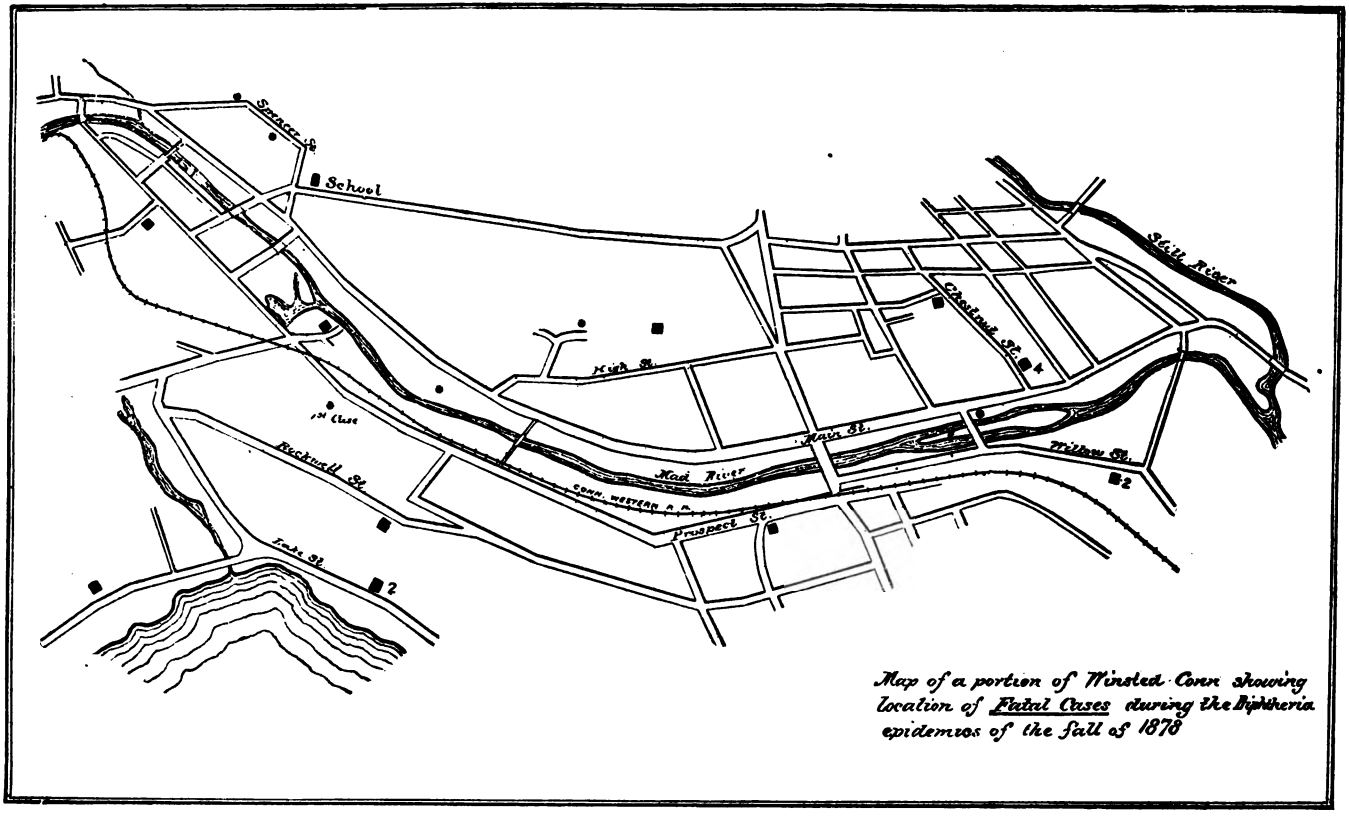

Map of a portion of Winsted Conn showing location of Fatal Cases during the Diphtheria epidemics of the fall of 1878

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two or three deaths would be about the average fatality from scarlet fever and the like."—[Extract from letter of J. W. Bidwell, M.D.]

The above extract describes very graphically the epidemics in Winsted. The lingering of the disease where unsanitary conditions existed, and its marked tendency to recur, are noteworthy features. The effect of the easterly storms was no doubt depressing, as these are confessedly deleterious from their cold and chilling tendencies.

In the first epidemic there was but one fatal case in a house ; in the second there were more in several instances. On Chestnut street there were four fatal cases in one house. In the rear is a swamp hole with no means of drainage ; the sanitary surroundings in other respects were bad.

The accompanying map shows the location of the fatal cases ; a circle showing the first, a square the second, outbreak ; the numerals attached indicate the number of deaths where more than one occurred in a house. There were no fatal cases east of Chestnut street. The fatal cases only are marked : these were the centers about which the epidemic prevailed.

Norwich.—Diphtheria appeared first the last of July in a tenement house belonging to the "Falls Manufacturing Co." The first case was fatal. Within two weeks there were five cases in the same house, confined to two of the four tenements. For a week or two there were no new cases. It then broke out afresh in the next house on the same side of the street, and at about the same time in a house directly opposite, both tenement houses. There were fourteen cases and two deaths. An aunt of the last child who died attended the funeral on Monday, and was taken with diphtheria on the Thursday following. She lived in a single cottage half a mile from the tenement houses, in a healthy locality. But few other cases have occurred in town. One was in one of the best families, in the healthiest and most aristocratic part of the town. The victim was a lady thirty-eight years old, of delicate constitution, and with slight tubercular deposits in the apices of the lungs. She was sick six days and died, apparently from paralysis of the heart. I am told that two other fatal cases presented the same appearance. This lady was teacher in a Sunday-school. Three of her scholars on their way to school stopped in to view the body of a playmate dead of malignant diphtheria, and there were other children very sick with the same disease in adjacent rooms of the house. These girls with their teacher and a few others also from

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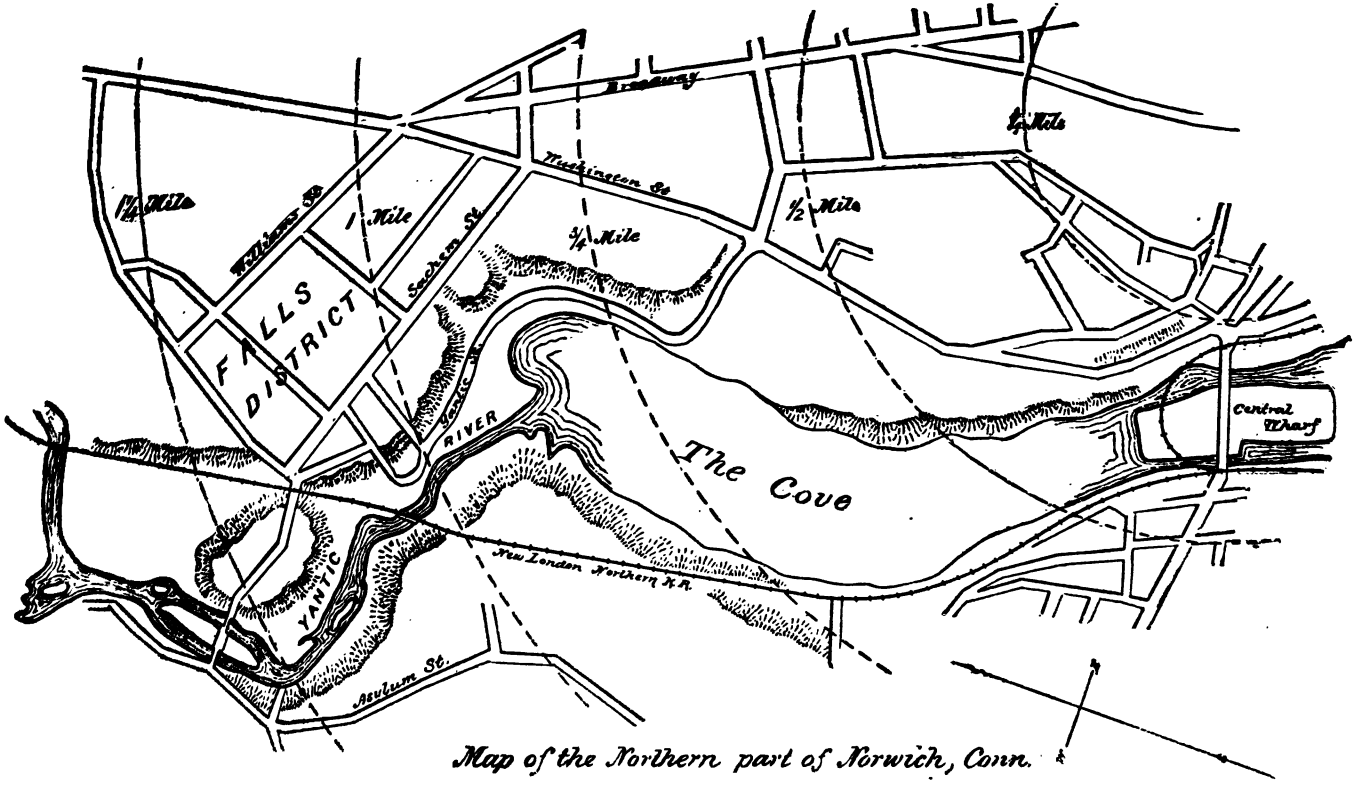

Map of the Northern part of Norwich, Conn.

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this infected district, occupied a seat together for about one hour. A week after the teacher and the three girls were taken with diphtheria. One of the girls died and also their teacher. This illustrates how cases may arise "in the healthiest and best localities." All intercourse with infected places should be under control of the board of health, and all contagious diseases at once reported.

This district was somewhat isolated from the rest of the city, lying near the river and composed of tenement houses with a few cottages and double cottages. Renewed outbreaks, with about a week or ten days interval, occurred until October, at which time our investigation was made. There were long ranges of pig-pens in a not over clean condition; shallow privy vaults not over two to three feet deep; heaps of garbage and untrapped cesspools covered with several feet of earth, whose only ventilation was through the pipe leading into the house, the coarse gravelly soil rendering it not necessary to often clean them. The worst condition was found in one of the cottages, where a perfectly flat shelf of masonry was the only apology for a privy vault. A teacupful of fluid would run over upon the ground; hence the filth accumulated on the surface. To that was added the house garbage, and near by were the windows of the sleeping-rooms of the children. All the children had diphtheria severely, and three died. There were twelve deaths in a population not much exceeding two hundred, and many severe cases. The disease did not spread into the city to any great extent, and only when directly conveyed. The cases which are of a sporadic origin do not appear to have as great power of self-multiplication, but the disease seems to take on an epidemic character after having passed through one or two human systems. Thus, where the virus is conveyed to a new locality and allowed to smoulder, it more often bursts out in an epidemic form than where it arises apparently *de novo*. It would seem to gain more power and virulency, or perhaps more adaptability, to attack the human system by repeated transmission, like the vaccine virus that acts more forcibly one remove from the bovine, that is, after having passed through one human system. Careful disinfection was practiced in all the cases carried to other parts of the city.

In New Haven there was a localized epidemic associated with unventilated cesspools connected by untrapped pipes, unclean vaults, and similar unsanitary conditions. This was confined to one district, causing fifteen deaths in October, nine in November, and eleven from croup, probably diphtheritic. These were due to

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neglect of well-known sanitary precautions, and emphasize the necessity of a sanitary inspector for tenement-houses, although these are not the only ones where there is gross negligence and its resultant of disease and death ; still their occupants are less able to protect themselves and more ignorant of the need.

Diphtheria has also been epidemic in Woodstock, from whence it was probably introduced into the neighboring town of Eastford.

The first case in Woodstock valley occurred the latter part of July in a girl aged thirteen, who was not attended by a physician, but by report, the local trouble was severe. In front of the house there is a small mill-pond which had run nearly dry for some time previous, and the general sanitary conditions around the house indicated carelessness and neglect. The second case resulted from direct exposure to this, and occurred in a neighboring house about a week later. The sanitary surroundings of this house were good. The next three cases were in the same family. The disease soon became epidemic, spreading from this as a center, and was accompanied by a large number of diphtheroid cases. Children under twelve were generally the only ones attacked. There were two deaths and, including diphtheroid cases, thirty-five cases. A common sanitary defect was found in connection with the sink-drains, most of which opened a foot or two from the house, with shallow pools and damp, filth-saturated soil.

The disease has been very prevalent in Colchester and vicinity. Our correspondent writes that it first appeared August 3d ; it rapidly took on an epidemic form, and was attended with a great number of diphtheroid cases, all but one children from five to eleven years. Infants have rarely had it, nor adults—but one case known. Three deaths occurred after the danger was supposed to be over. The relapse in these cases was sudden, and death ensued within twenty-four hours. These cases were among the most severe form of the disease, where the growth of the membrane had been very extensive. The following facts are suggestive. In one house there were four fatal cases of diphtheria. The first cases were here, and at the first outbreak, in August, two children died, one within two days, the other three days after seizure. In October the disease reappeared here with two fatal cases and the same duration. The house referred to above was occupied by a washerwoman, and all the waste water and kithchen slops were, from a defect in the sink, thrown out of a back window. The house was upon a hill-side, and the slope of the land caused the

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waste water to run down through the cellar wall into the cellar, so making a cesspool out of it. The two younger children first succumbed. It is probable that here was the focus for the epidemic, as the cases of sore throat preceding were, even if diphtheritic, not malignant. In a total mortality of sixty-four, from all causes, there were twenty fatal cases of diphtheria, a little over thirty per cent. In August there were two deaths, in October ten, in December five, and one each in September and November. The accompanying diagram shows the location of the fatal and severe cases.

In Eastford there have been about twenty cases and three deaths. There had been no cases there before for twenty years, and had the first case been thoroughly isolated and the surroundings disinfected, the disease might have been arrested. The disease was introduced from without, the second cases were in a neighboring house within ten days after, and were much more severe, two fatal. The disease then spread rapidly through the village, accompanied by the usual diphtheroid cases. As it is a new disease in that region, diligent care is necessary in disinfecting to prevent its securing a permanent foothold.

In North Stonington diphtheria prevailed extensively, with the usual number of diphtheroid cases ; a considerable percentage of the cases were characterized by gross negligence of all sanitary considerations. The disease appeared to be sporadic, and originated under the conditions above alluded to. There were nineteen deaths reported, all of children. There were twenty-four deaths during the year from zymotic diseases, fifty per cent. of the total mortality in that town, and equal to the whole number of deaths reported in 1877. In one house there were four cases, two of which died within twelve hours after seizure. The neglect of the ordinary laws of health and disease may continue for a long time with impunity, but the retribution is terrible when it does come. The neglected hovels of the poor and degraded often furnish prolific nurseries of death.

The cases in a family in Granby illustrate the retention of the contagion. The family (colored) lived in a miserable, filthy hovel, and in the spring of 1878 the father and several others of the family died of diphtheria. On the approach of very cold weather the bedding then used was brought into requisition again, when the disease reappeared, attacking successively the whole family and taking off two out of the three remaining. As the hut was isolated and there was little or no communication with neighbors, the disease did not

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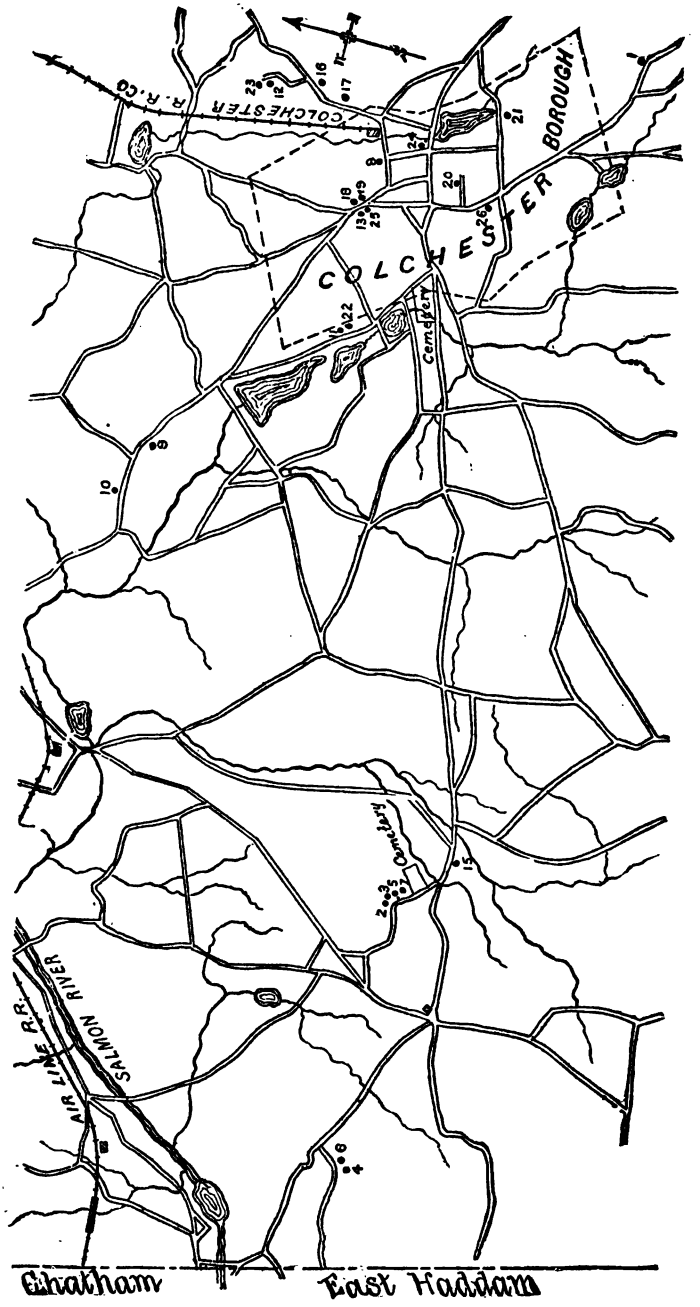

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spread extensively. There were four deaths in one family in East Granby near by caused directly by contagion from these.

The method of the transmission of this disease and the theory of its increased virulence by successive transmissions were well illustrated in a series of cases in New Haven county, as reported by the physician in charge. A lady visitor from a region where diphtheria had been prevalent, had herself a mild attack of sore throat, hardly requiring treatment. About a week after her arrival three of the children were attacked, and one died. All the adults of the family were more or less severely attacked. One of them meanwhile had left for a visit to a neighboring town, and was there attacked. After the usual period of incubation the children of the family were seized with diphtheria, and one died. The disease then attacked the adults, with one fatal result. This series of cases was very carefully studied by a very intelligent observer; the houses were in an unusually good sanitary condition, and all other probable causes of contagion were considered.

One form of this disease that has been prevalent in this State seems not to be the malignant, contagious form that is sometimes encountered. The slight comparative mortality is noticeable. A false variety of diphtheria, or at least a mild form, has been very prevalent in certain parts of England, which this variety very closely resembles. The following are its distinctive features:

1. The disease is to a great extent confined to the tonsils, sometimes invading the glands of the neck, and although yellowish-brownish spots are seen, there is no tough leathery membrane.

2. The patients are anæmic, have no albuminuria, pulse usually full, average duration ten days. It is communicable, but not very contagious.

3. It is seldom fatal, and is not followed by paralysis.

It is essentially a filth disease, always associated with some organic impurity of air or water, and saturation of the soil around dwellings with slop water.

There is often a prevalence of sore throats of a non-infectious nature before an outbreak of diphtheria. Some who accept the germ theory of disease believe that an already existing organism may take on an infectious character, and in that manner explain the origin of typhoid fever, diphtheria, and the like, from unsanitary conditions, without the specific virus from a preceding case. Whether these mild cases can lead up to diphtheria or not, it

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seems that the virus of diphtheria gains new strength, malignancy, and infective power by passing through a human organism, just as the most vigorous vaccine virus is that one remove from the bovine; that is, that which has passed through one human system.

SANITARY REPORTS FROM CITIES AND TOWNS.

The following are selected from reports received. These when complete from all parts of the State will form the basis for some general conclusions, and a tabulated report:

BRIDGEPORT—DR. N. E. WORDEN.

The population of the town by the last census, that of 1870, was 19,076. Since that time additions of territory have been made, and the parts just beyond the boundaries, attended in sickness by Bridgeport physicians, and reaping all the benefits of the town's people, have greatly increased in numbers. Good judges estimate the present population, including the annexed portion and West Stratford, at about 25,000.

There are no statistics available by which the number of nationalities represented can be ascertained, but from my own knowledge, I can mention the following: Irish, German, African, English, Scotch, Hebrew, frequent in the order named, so far as I can judge. Besides these, there are French, Italian, Swede, Swiss, and Norwegian.

The manufactures and trades are varied. There are upwards of 120 of all kinds, the largest being the well-known Sewing Machine establishments of Mr. Wheeler, and the late Elias Howe.

The employés of these factories live distributed in all parts of the city, an undue proportion of them, however, living in what is called the Eastern district. Most of the houses there are small, and built for tenements. Their surroundings are not such as wealth and intelligence might procure, nor is that portion of the city as well provided with sewerage as it should be, or as its more influential neighbor, the main portion of the city. Indeed many glaring violations of hygienic laws are here noticed, such as privies heaped full, cess-pools emptied out on the ground, and both in close proximity to wells which supply several families with drinking water. These causes must of course have to do with the health of the employés, as it deals with the general health. But there are special liabilities to incur certain diseases in some of

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these establishments, as in the hat factory, where dyes are used, and where the fumes of chlorine are constantly being given forth, together with the great heat and the particles of wool flying about. All of these tend to cause irritation in the air passages, and to produce pulmonary diseases. In the foundries the intense heat and the violent labor required would seem to have a tendency to cause disturbances of the circulation, leading to hypertrophy or other organic diseases of the heart. The factories themselves are kept clean, and are all provided with means for full ventilation. My attention has recently been called to the frequency of pulmonary consumption among those following the profession of dentistry. A number living in this city have died of this disease, among their number several who seem to have had no inherited tendency. This may perhaps be explained by the confinements which the business compels, the cramped position in operating, and the being obliged to inhale the breath of the patients—breath which is sometimes diseased, many times foul. I think this is a subject worthy the study of the medical fraternity.

The soil of Bridgeport is at bottom sand, overlaid with clay, and topped with a rich layer of loam. Toward the north are outcroppings of trap rock in abundance, the result of upheavals. There are no geological formations of especial interest in the immediate neighborhood. The southern coast bordering the sound is low and consists for the most part of salt marshes. Numerous springs and streams flowing through, give an abundant water supply, while wells can be dug almost anywhere at a depth varying from fifteen to fifty feet.

Private enterprise has not directed its attention to the subject of artificial drainage. The city has provided well for what lies within its jurisdiction, curb and gutter having been laid almost wherever streets have been opened, thus forming an exit for the surface water. The town in the rural districts contains many acres of swamp land unimproved, which good drainage and cultivation would cause to bud and blossom. I question whether the reclamation of wastes like these does not stir up the poison of malaria.

The natural drainage has already been spoken of. The formation of the land is admirably adapted for such a purpose. Sloping as it does from north to south, the discharge of surface water is very complete. The Pequonnock river intersects the town, dividing the city into the eastern and western districts, receiving

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the waste and sewerage, and discharging it into the waters of the sound. Indenting the coast are numerous creeks, admitting the tide water. The channels of these are narrowed, compelling a swift movement of the water at ebb and flow. Consequently the banks are exposed to the sun and air most of the time. If these streams should be made a deposit for refuse to any extent, it is quite certain that such dèbris, left upon the banks, would breed disease by the consequent decomposition. Such result has not yet occurred. Perhaps the healthy condition of our city is owing, more than has been thought, to the natural advantages of its drainage.

Within the limits of the town are numerous ponds of water, either natural or artificial, but in all of them the water has so much motion as scarcely to permit them to be called stagnant, The ponds called Pembroke Lake and Stillman's Pond on the northeastern boundary, approach as near to a condition of stagnation perhaps as any. This is a slowly running stream, which, alternately widening and narrowing, forms a series of ponds, extending from north to south, until it finally reaches tide water. At its juncture with the sound, a bridge with tide gates has been built for mill purposes, thus preventing a free flow. A turnpike with narrow culvert has been built within a few years, and the railroad crossing with its culvert forms still another interruption. It is a noticeable fact that the first cases of malaria occurring in this town were found along the upper borders of this stream. People living along the banks of this body of water are still grievously troubled with malaria, and the affliction is said to have increased since the building of the turnpike and culvert before mentioned.

The southern border of the town is indented with numerous creeks, the banks of which are covered with a growth of coarse sedge and salt grass. The beds of these streams when thoroughly dug out will form channels for commerce and traffic by water, for these places are destined to be the sites of manufactories. The tide in these creeks runs rapidly, and the water is quickly emptied, leaving the muddy banks dry and exposed to the sun for many hours out of the twenty-four. Attention ought to be paid to these places now, lest they be made the deposits of refuse and garbage, which, left exposed to the sun, shall become nuclei of disease. Some of the ponds supplied by fresh water streams, are diminished in volume, and the banks left dry by failure of supply owing to

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the drying up of the streams in summer. This is particularly the case with the large mill pond near the cemetery in the northeastern part of the town. An artificial pond, made for the sole purpose of gathering ice, has been made, toward the northern boundary of of the town, by the side of the road formerly called Division street. This pond is flooded only during the winter, at other time being a marshy tract through which flows a small stream.

The city is well supplied with sewers which run through all the principal streets, at sufficient depths, and of size large enough (with few exceptions) to carry away all the surface water. On March 1, 1874, there were 84,162½ feet of sewer mains. There have been added up to July, 1878, 16,491½ feet, making in all 19.06 miles of sewer mains.

The sewers empty for the most part into the harbor, all of them discharge their contents into tide water. On the south side the creeks will receive the contents.

The sources of water supply are the city water works and wells, principally the former, and the supply is abundant. Its source is the various streams to the north, which have been turned so as to flow into the receiving reservoirs. These latter are large artificial lakes made by damming a narrow passway in the course of some stream, the trees in the space to be flooded having been previously felled. There is consequently considerable débris always floating in the water. These reservoirs are situated in the town of Trumbull. In case of a scant supply in summer, water is pumped into the receiving reservoir from the large pond before referred to in the Pequonnock river at North Bridgeport.

The water of the wells is mostly hard, being impregnated with lime.

The wells are shallow, springs being found at little depth. Hence these wells are often reservoirs for the drainage of the ground immediately adjacent, forming perhaps the whole of the yard. In this portion will most always be found a privy; often a cesspool, both full, and in many cases a stable in addition. For the houses are not connected with the sewers, and the old-fashioned cesspool catches all the waste. The drainage from all these flows into the well which supplies drinking water for the household. This condition exists to a fearful extent in the eastern district and the western part of Golden Hill, where the poorer class of people live. Oftentimes the contents of the cesspool are emptied upon the bare ground, and are left to disappear by absorption or by evaporation.

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I do not think there is a cistern used for drinking water in the city, nor do I believe there is a cistern supplied with a filter.

"Garbage and offal," by Chapter XV of the City Ordinances, is "declared to mean only such refuse matter as accumulates in the preparation of food for the table." The city is divided into garbage districts, of which there are three, and the removal of the refuse is done by contract. Much of it, however, is disposed of independently by private means. The city ordinance concerning the removal of garbage is not well observed. The scrapings of the streets and the contents of the sewer wells are carried through the streets in a cart which leaves its droppings along the road, and what is left is dumped upon the common grounds near the approaches to two of our most traveled bridges, and are utilized in filling up low ground; the practice is questionable in its sanitary relations. Our city authorities are much to blame for allowing dumping grounds in places so within the business limits.

There is a local health organization provided for in Chapter XIV, City Ordinances. It consists of the mayor and aldermen, who may appoint a clerk.*

The number of paupers is estimated at about 1,200. There are about three hundred heads of families with an average of about four to each family. Of these there are about seventy-five constantly at the town house, deriving their entire support thence. The remainder are helped in part at their homes in different parts of the town. The town farm consists of forty-two acres of land near North Bridgeport, on which is the almshouse, a fine brick structure, with proper buildings adjoining. The contract system prevails in the provision for the poor.

There are no public institutions for charity. The Orphan Asylum, erected by the efforts of patriotic ladies during the war, has become now the child of the city, and is supported by private benevolence. Besides the orphans of soldiers, who will soon have grown beyond the need of any asylum, such children are received as are given up by their parents to its care.

The only public institution of correction is the county jail, in the northern part of the city. The building is new, of brick, and with all requirements and modern improvements. The average number of prisoners is about sixty, a larger number during the

* An ordinance creating a new Health Board has since been passed.

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winter months. The institution is well kept, and no death has occurred there of a person taken sick within its limits since the present structure has been erected.

The principal disease is malaria. The most frequent cause of death is diphtheria, the mortuary list showing between seventy and eighty deaths from this cause annually. Third on the list (consumption coming between) is disease of the heart, pneumonia following. The climate seems more particularly to develop diseases of the respiratory organs.

The accompanying map shows the location of the fatal cases of diphtheria in 1877 and 1878.

The principal source of danger to life and health is our inefficient Board of Health, for all hygienic laws are openly violated without rebuke. Next are the shallow wells in proximity to full privies and unemptied cesspools.

The registration laws are very poorly observed. Returns of births and deaths are made but once a year. Physicians are remiss. In one case no returns could be obtained until the clerk made it out.

Improvements most needed are, that connections should be compelled between houses and sewers, especially where the dwellings are in blocks or flats, with plumbing under the supervision of the health officer, and the abolishment of privies. That part of the course of the Pequonnock river between the dam at the pond alluded to and the head-waters of Berkshire pond is a broad expanse of lowland, covered with a growth of stunted trees. The region is infested with malaria, and at the present time it is the only place in which diphtheria is prevalent. The course of the stream ought to be narrowed, and the whole space filled in.

For a proper registration of vital statistics, an enforcement of the laws for that purpose provided is necessary.

Illumination is supplied by the Bridgeport Gas Light Company, a chartered corporation. On the outskirts, gasoline is used, with self-feeding lamps.

NORWICH—DR. C. M. CARLTON, REPORTER.

The population, estimated at 16,500, is composed, in addition to the Americans, of Irish, German, English, French, and Scotch, and about three thousand live in tenement-houses. Pulmonary diseases amongst the operatives in the cotton and woolen mills are

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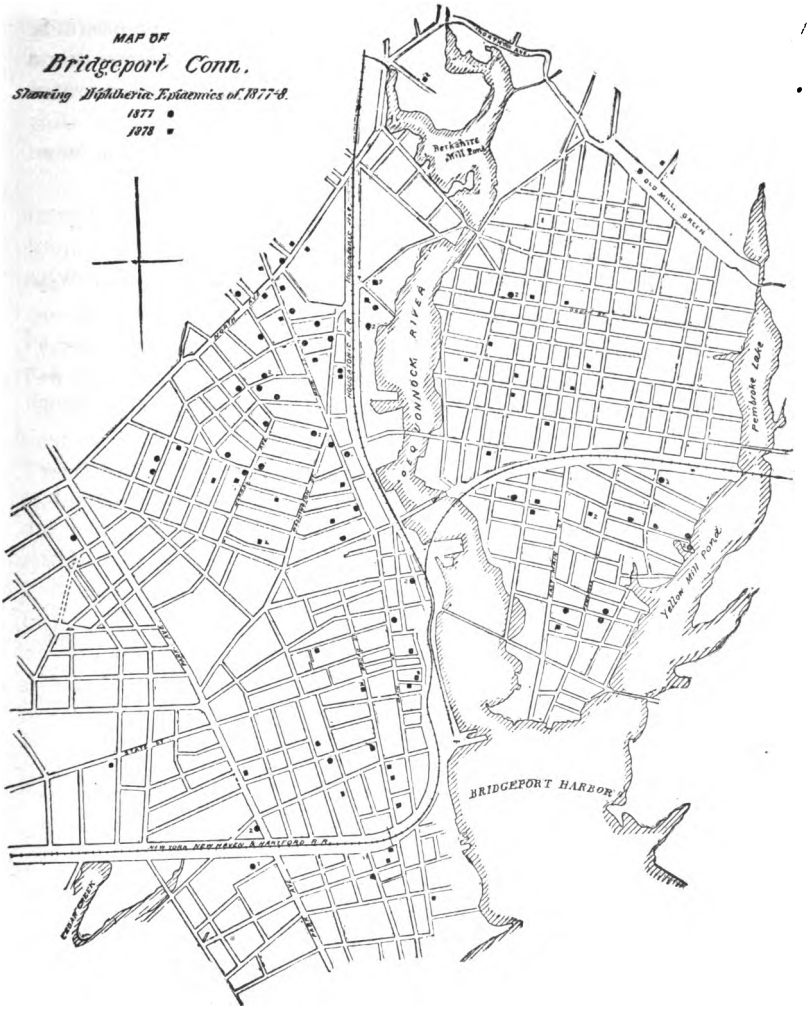

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very prevalent. Most of them live in cottages and tenement-houses. Rockwell pond, and both Yantic and Shetucket rivers are partially dry during the summer, and the river bed in places offensive from the outhouses on its banks. The area drained by sewers is about eighty acres, and there are about three miles of sewers which empty into the rivers. The dumping-ground is Yantic Cove, which is to be filled in this manner. In some cases there are cesspools which seldom require cleaning, as the soil is gravelly and porous. Intermittent fever has appeared here this fall for the first time, except a few cases on the line of the New London & Northern Railroad, when that was built.

ELLINGTON—A. A. HYDE, REPORTER.

Estimated population 1,500; principal occupation, farming. The soil is a sandy loam, favorably situated for natural drainage. There are three hundred acres of marshy land which are constantly decreased by drainage, and when extensive ditching has been done malarial fevers have prevailed. The average depth of wells is twenty feet, the nearest privy to well fifteen feet, average distance of sink drain from well one rod. Prevalent diseases, *typhoid fever, typhoid-pneumonia, diphtheria, dysentery.*

COLLINSVILLE—DR. G. R. SHEPARD, REPORTER.

Population, American, three-fourths; French Canadian, one-eighth; Germans, one-eighth; Irish, one-twenty-fourth; Swedes, one-twenty-fourth. The largest number of families living in a tenement-house is seven; average, four. The principal disease, due to occupation, is grinders' consumption, from the dust inhaled. The soil is gravelly. There are no sewers of any length; the principal drainage is by roadside gutters. The bed of the pond is exposed by day and fills up again at night to a very great extent in summer. The average depth of wells is twenty feet; filth is disposed of in heaps near the house. Malarial diseases, *dysentery* and *diarrhœa*, and of late *scarlet fever* and *diphtheria* have prevailed extensively. There is no local health board except the selectmen.

SUFFIELD—DR. J. K. MASON.

The principal occupations are farming, and the manufacture and sale of tobacco, the staple crop. The soil is clay or gravel naturally, well situated for drainage, with about three thousand

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acres of low, wet land, and two hundred of swampy, marshy land; about four hundred acres have been drained during the last five years. The principal unsanitary conditions are wet and unclean cellars, foul wells, cisterns, sink-drains, and cesspools. The principal diseases are dysentery, pneumonia, consumption, typhoid and typho-malarial fevers. The water supply is from wells and cisterns, mostly hard. The average depth of wells, twenty-five feet; shallowest, eight feet, and the least distance of privy and sink-drain from well, fifteen feet and ten feet respectively.

WILLIMANTIC—DR. C. J. FOX.

The population is composed of Americans, Irish, and French. About two thousand live in tenement-houses; the same number in cottages, and a thousand in boarding-houses. The greatest number of families living in tenement-houses is eighteen; average, four. The principal diseases liable to occupation are those of the lungs. The principal manufacturies are sewing-cotton and silk. The soil is gravelly and naturally well drained. An area of 150 acres is drained by sewers. The wells range from sixteen to thirty feet in depth, and the water is pure, but generally hard. The garbage and house refuse is pretty promptly carted away to the neighboring farms. The principal sanitary evils are deficient and incomplete sewerage, and poor ventilation.

DERBY—DR. C. H. PINNEY.

Estimated population, ten thousand—one-half Americans, one-third Irish, remainder English and German. A very large proportion of the employés live in cottages. The drainage is excellent; there is no flat land; the soil sandy and gravelly. There are three water companies that supply this and adjacent villages, but many bring water to their houses from springs in the hills; the water is soft and clear. The house refuse and filth is removed by the river. There are no diseases directly due to occupation. The largest number of families in a tenement-house is twelve.

NAUGATUCK—H. C. BALDWIN.

The population of about 4,000 is composed of Americans, nearly half Irish, about one-third English and Germans, and a few French, and the employés are about equally divided among tenement-houses, boarding-houses, and cottages. The largest number

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of families in a tenement-house is six. The principal manufactures are rubber, iron, cutlery, and woolen. Those that work in the cutlery shops are subject to grinders' consumption, and those in the rubber and woolen mills are more liable to diseases of the lungs. The natural drainage is excellent; the Naugatuck flows through the center, and there are no bodies of stagnant water. There is not sufficient care taken in summer to cleanse and deodorize privies and cesspools, and as the soil is very porous, the wells often near, they may become contaminated. Typhoid fever and malarial diseases are prevalent.

PLAINFIELD—REV. J. H. FELLOWS.

The principal occupations are farming and manufacturing cotton and woolen goods. The soil is sandy and favorable for drainage. There is but little wet and undrained land. Consumption is the principal cause of death. Typhoid and scarlet fevers prevail. Water is obtained from wells and springs, the former hard, latter soft. Some of the wells are but six feet deep; average, twenty; deepest, sixty. The least distance of privy from well is fifteen feet, of sink-drain, ten feet; average, twenty-five feet. The principal unsanitary causes arise from an insufficient supply of water and the conditions above described. A gradual form of paralysis is the only peculiar form of sickness I have noticed.

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